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VIEWS, NEWS AND INTERVIEWS.

A gentleman, who for some years has been engaged in the service of a large telephone corporation in Greater New York, was recently asked by an acquaintance to name the title of his position. The telephone man replied somewhat as follows: "I hardly know myself. Whenever there is any little task requiring some tact, or when an unruly customer has to be pacified, or when a situation requiring a little diplomacy arises, or when any kind of work that no one else wants to do comes along, your humble servant is called upon. I have asked several times to have my position defined. The nearest I can come to it is that I am a special agent. I have about decided to take a title for myself, and I think it will be 'First Aid to the Injured.'"

An Australian named Thunderbolt has invented an electrical governor. Only natural.

A feat in telegraphic operating was performed by the Sydney, Australia, staff of telegraph operators on the night of the federal elections. No fewer than 1,065,570 words were received and transmitted in the offices between 6.20 P. M. and 2.30 A. M., or at the rate of 133,196 words per hour. The staff of operators employed consisted of 120 men engaged at 56 instruments. This, according to a contemporary, forms the record for Australia.

A New York daily paper says that on a recent night a trolley wire parted at Broadway and Hewes street, Williamsburgh. When the ends struck the pavement they squirmed around and made it dangerous for pedestrians and vehicles. John Lane, an electrician of the Brooklyn Heights company, guarded one end of the wire, and Policeman McGrath the other. Edward Gans, of Brownsville, came along in an express wagon and insisted upon driving ahead. Lane warned him that he and the horse might be killed by an electric shock. The expressman declared that he didn't care and began to lash the horse. Lane refused to allow Gans to proceed, and then Gans lashed the electrician. Lane's face and left thumb were cut. When the policeman attempted to arrest Gans he was also hit with the whip. McGrath overpowered the man and took him to the Clymer street station, where Gans declared he was persecuted because he was a Jew. He was locked up, and when he was arraigned later in the Lee Avenue Court he said he was ignorant of the fact that electric wires were dangerous. He was held in $300 for a hearing.

The last annual report of the Erie Telegraph and Telephone Company was the most complete telephone company report ever issued, as it contained maps of all the sub-companies of the American Bell Telephone Company, in which the Erie Telephone Company has a majority interest. It also contained photographs of the telephone buildings in different cities, besides complete financial statistics. The Erie Telephone Company's lines are in territory of great possibilities in the way of development. The gross earnings of its companies will probably increase $200,000 this year, and it is quite likely that Erie will be the first telephone company to raise its dividend rate.

ELECTION ILLUMINATIONS IN PRINTING HOUSE SQUARE, NEW YORK CITY.

Sooysmith & Company, the well known contractors, of New York city, have formed a company which will bid for the underground rapid transit roads in New York, according to specifications laid down by the Rapid Transit Commission. The bid will be put in as soon as the commission is ready to receive it.

Illuminated Election Returns.

In connection with the handling of the recent election returns by the press, the elaborate system of illuminated displays which were employed throughout the evening by the various journals in New York caused much comment. In various locations throughout Greater New York the publishers of the daily papers had constructed huge screens and a little distance away towers, in which were placed the lanterns and electric paraphernalia for the illuminations. Also, in these towers, which were several stories in height, were carried telephone and telegraph wires, and operators transmitted the messages to the men who had the search-lights and lanterns in charge. The work done by the New York *Journal*, in charge of Mr. R. C. Daniels, of J. B. Colt & Company, who furnished and operated all the apparatus, was perhaps as elaborate as any. Mr. Daniels had been asked by Publisher Hearst to prepare the most complete method for this sort of work, and for two weeks preceding the election preparations were carried on. Special lanterns of the "Criterion" form, using six-inch condensers, soft cored carbons of the "Electra" brand and 75 amperes of current, were used throughout. Current was obtained from the regular Edison circuits. On the building at Twenty-third street and Broadway, in connection with the telephone and telegraph which had been established, three keyboards were placed on three sides of the room, and, as the returns were received, the operator would connect the letters on the keyboard and, by means of the main switch, flash the message on the screens; also, by special stereopticons, the biographies of the candidates and various views were shown on one part, and kites were flown in the air, on which specially designed projection searchlights threw pictures. It is said that upwards of 300,000 people were entertained in and about Madison Square by these illustrations. On the Tribune Building down-town the screen used was 125 feet high and 50 feet wide, and the same method of showing the election returns and biographies was carried out there.

ELECTRIC LIGHT FLASHES.

The Harvard, Ill., electric light plant has been shut down for want of capital to run it.

The citizens of LaGrange, Mo., have voted to invest $6,000 in an electric light plant.

The Boards of Public Works and Safety, of Indianapolis, Ind., are discussing the advisability of placing an electric plant in the new police building, which will have sufficient capacity to light the police station, basement of the court-house and Tomlinson Hall.

The Lowell Water and Light Company, the Peninsular Power and Heat Company, and the West Michigan Electrical Company, organized to develop the water power of Flat River at Lowell, and whose aggregate capital was $236,000, has been sold at auction for the benefit of creditors.

A complete system of electric lighting is being introduced in the buildings and grounds of the Soldiers' Home, at Washington, D. C., the effect of which will be to reduce the expense of illumination, and, at the same time, make the grounds entirely safe for driving and bicycling during evenings.

The Redlands, Cal., Electric Light and Power Company at its annual election selected the following board of directors: Henry Fisher, H. H. Sinclair, G. B. Ellis, E. T. Painter, J. H. Fisher and F. G. Feraud. The following officers were elected: H. H. Sinclair, president; G. B. Ellis, vice-president; F. G. Feraud, secretary First National Bank, treasurer.

The Holland Trust Company, of New York, has applied for a receiver for the Saginaw, Mich., Electric Light and Power Company, pending a foreclosure of the mortgage in the form of a trust deed given in 1889 to secure payment of $50,000 first mortgage bonds. The liabilities of the company are placed at $70,000 and the assets at $42,000. Forty shares of stock are held in Detroit, and the remainder are owned by Fort Wayne, Ind., people. A hearing is asked for November 18.

The Abington & Rockland, Mass., Electric Light and Power Company is about to expend the sum of $20,000 on its plant in North Abington, it is reported. The company supplies the local street railway with power, and in order to keep pace with the growth of the business more machinery is necessary. An order has been placed for a storage battery, with a capacity of 525 volts, by means of which the output of the station will be equalized. Ground has been broken for a building 24 by 30 feet, where the battery will be installed. The engines will be overhauled and repaired and the boilers supplied with down drafts.

A certificate of incorporation of the new Amsterdam Gas Company, of New York city, has been filed with the Secretary of State. The company incorporated with a capital stock of $23,000,000. Ten millions is preferred stock. The company will carry on operations in New York city and county, and, in addition to manufacturing and supplying gas for lighting purposes, it intends to manufacture and supply electricity for lighting, heating and power purposes. Its directors are: E. M. F. Miller, James Tolfree, F. L. Eldridge, W. C. Cox, C. M. Hillings, W. T. Eldridge, Sherman Flint, F. P. Voorhees and M. T. Johnson, of New York city; J. B. Summerfield, of Brooklyn; and Noel Gale, of Clifton, Richmond County.

Chicago News Notes.

McGill & Pomeroy, who recently placed the new "Dirigo" arc lamp hanger upon the market, report a gratifying demand for same, which would seem to show that the stations were in great need of just such a device.

"Not how cheap, but how good" is the motto first adopted by some enterprising dealer in clothing or some other necessary of man. The same applies to electrical goods, and when a concern like the Central Electric Company advertises good house goods at cheap prices, the orders should come in right along. And they do, we are told.

While the building of telephone lines has about stopped for the season on account of cold weather, the telephone manufacturers still are kept busy furnishing equipments for interior exchanges, or re-equipping existing plants with improved apparatus. Such, at least, is the case with Stromberg-Carlson Telephone Manufacturing Company, which report orders enough on hand to keep busy for some time to come.

The growth of a modern business house may well be judged by its advertising methods, or, rather, by the amount spent in advertising. This recalls the story—true or otherwise—of a business man whose friend offered to wager a large amount with him that he, the business man, would find it impossible to spend all his profits each year in advertising. The friend maintained that, even if all the profits were spent the first year in the manner contemplated, the returns the second year would so increase the profits as to make up the last year's expenditure, and so on each succeeding year. The Western Electric Company is probably not spending all its profits in advertising, but it appreciates the importance of carefully preparing whatever copy is sent to a paper. This part of the business and the preparation of catalogues, circulars, price-lists, etc., has made it advisable to create an advertising and catalogue department, in which Mr. Thos. Grier is the presiding genius, and in which he is thoroughly *au fait*.

C. E. K.

Chicago, November 12.

A trolley car was held up on the Paterson, N. J., Plank Road line on November 1. The conductor was robbed of his watch and a small amount of cash.

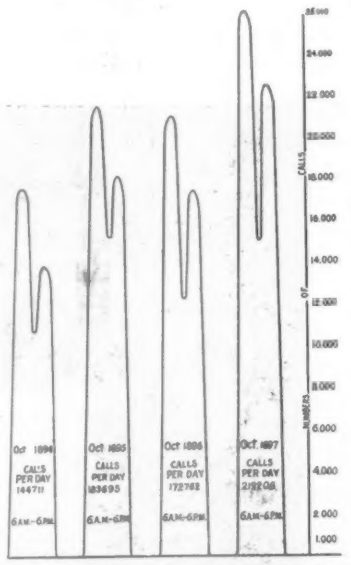
TELEPHONE TRAFFIC IN CHICAGO.

A TEST OF GENERAL BUSINESS.

In the records kept by the Chicago Telephone Company during the past five years, showing upon one day of each month the number of telephone calls made in the Chicago exchange, a comprehensive and accurate showing has been made of the general condition of business in the city. The monthly record in the form of a chart indicates the rise and fall of messages hour by hour throughout the day, rising to a maximum height at about 10 o'clock, falling at noon, rising again in a broad sweep through the afternoon and falling abruptly at the close of business hours after five o'clock.

In these records the month of October has been found to be representative of the Fall and early Winter conditions as shown by telephone calls, and a comparison of the October records of the past four years is especially interesting on that account.

The accompanying chart shows the telephone calls handled in Chicago for one day in October each year from



CURVES SHOWING ORIGINATING CALLS IN THE CHICAGO TELEPHONE EXCHANGE, FROM 6 A.M TO 6 P.M., ON OCTOBER 10, 1894, 1895, 1896, 1897.

1894 to 1897 inclusive. The total for 1897, showing 219,208, is an increase of 74,496 calls per day over 1894, or more than 50 per cent. Fifty per cent more business is now being carried on by telephone than three years ago and the service to patrons of the exchange has correspondingly increased in value.

The increase of 46,446 daily calls in 1897 over the same day in 1896 is clearly significant of the improved business conditions existing at the present time. A detailed analysis of the reports for the two years shows this increase to be largely confined to business lines, indicating clearly that good times in business makes busy telephones.

During the past two years the subscribers' lines in the Chicago exchange have, by the introduction of so-called automatic or slot-machine telephones, been largely relieved from the burden of the calls of the telephone deadbeat. This species, a development of recent years, and of both sexes, with nothing to talk about, formerly consumed hours at public telephones made free by those in whose premises they were located, calling up clerks, typewriters and other employés in business offices and indulging in protracted and useless conversation. This not only interfered with the service of the telephone from which the calls were made, but kept the lines called for busy and unavailable for the purposes for which they were provided. Now payment is made at public telephones by those who use them, and the lines of the subscribers to the exchange are relieved from the infliction previously endured.

The constantly increasing number of calls made in Chicago shows to what extent the service is utilized, and is said to be still far in advance of any city in the world. New and improved apparatus has been devised to meet the demands of the service. Many of the busiest lines are now equipped for automatic signaling, as in the "express system," and new offices are being established to provide for further extensions. The plant of trunk lines connecting the various exchanges grows with the number of calls each month and the force of the company, now numbering over 1,200 people, increases constantly to meet the demands of the service.

The new plan for party line service at private residences at reduced rates has greatly popularized that branch of the service, and morning telephone calls are quite the thing up and down the boulevards and in all residence portions of the city.

The Effects of X Rays on the Animal Organism.

Many cases have been recorded in which the taking of Roentgen photographs of the living body has been followed by troublesome dermatitis, and even by ulceration of the skin, says the London *Lancet*, but these lesions are by no means constant, and the exact method of their production is not fully explained. The precautions to be taken for the minimizing of this inconvenience in the practical use of the rays were described in a communication made to the Congress of Neurology, Psychiatry, Medical Electricity and Hypnology, which met at Brussels last September, by Dr. Foveaux de Courmelle, of Paris. He stated that these accidents were not infrequent in radiography, where the contact-breaker of the induction coil was made to vibrate slowly, and the Crookes tube, being uncovered, gave off both X rays and cathode rays. In radioscopy, on the other hand, the motion of the contact-breaker is very rapid, the current is one of high frequency, and the vacuum tube is wrapped in black cloth, which stops the visible or light-producing rays, but presents no obstacle to the X rays; under these circumstances it is known that injury to the skin is unusual, and even after prolonged exposure does not amount to more than superficial desquamation. Moreover, the interposition of an aluminum plate between the Crookes tube and the patient obviates the accidents which many observers attribute to X rays produced by electro-static currents or high-frequency currents. It would appear that it is only the cathode rays that are injurious, and there is no difficulty in excluding them.

TELEPHONE NEWS AND COMMENT.

The Bell Telephone Company, of Fort Scott, Kas., has commenced operation on the long-distance telephone, which is to extend from there to Nevada and Rich Hill.

A telephone line is being put up between Garfield and Munster, Ill., and the matter of extending the line to Streator is being agitated. This would give a continuous line from Magnolia *via* Wenona to Ottawa and Joliet, Ill.

A company with $100,000 capital has been organized in Houghton County to supply telephone service for the whole county with the idea of afterward extending the service to the neighboring counties of Baraga, Marquette and Ontonagon, Mich.

The Central Union Telephone Company, of Delaware, Ohio, has reduced the rental of instruments to business houses $2, private residences $1.25, and where one person takes two instruments, one business and one residence, the rate is: Business, $2; residence, $1.

According to an official report, the telephone system is not progressing very rapidly in Russia. In 1896 there were 56 public lines in use, against 43 in the previous year, with 8,331 subscribers, or 2,214 more than in 1895. Eleven private lines were working with 10,164 subscribers, showing but a small increase over 1895.

The stockholders of the Gray Telephone Pay Station Company, at their annual meeting elected the following directors: Amos Whitney, F. A. Pratt, Franklin Clark, H. R. Mills, William Gray, E. W. Kellogg and Charles Soby. The directors elected these officers: President, Amos Whitney; secretary and treasurer, Charles Soby.

The Wayne, N. Y., Telegraph and Telephone Company has entered a protest with the Village Board against granting a franchise to the Citizens' Telephone Company, of New York, which is about to extend its lines in Wayne. The former company claims the right to the streets of the village by virtue of a franchise granted in 1895. As this company, however, never took advantage of the privilege its franchise has probably lapsed.

The October, 1897, issue of the National Telephone Directory was distributed last week by the American Telephone and Telegraph Company. It is a marvel of completeness and consists of 783 pages, folio size, containing the name, address, business title and telephone number of all the telephone subscribers in the United States in connection with the long-distance service. The labor involved in preparing such a directory can be appreciated only by an inspection of the complete work. The book is bound in flexible covers, and its convenience of arrangement is perfect.

General Manager Angus S. Hibbard, of the Chicago Telephone Company, is sending out a very attractive and handsomely illustrated folder, calling attention to the party line residence service now offered by the Chicago Telephone Company. This service is arranged to accommodate from two to four subscribers upon one circuit. The bell of a subscriber rings only when he is called. The battery is located at the telephone office and not at the residence. The service affords communication with the 14,000 subscribers of the Chicago Telephone Exchange, including all branches of the fire department, police department, messenger offices, as well as 900 physicians, 850 drug stores, over 300 retail markets, 210 livery stables and all the leading mercantile houses throughout the city. The annual rates for the service are $75 on two party lines, $70 on three party lines, and $60 on four party lines. The company also provides a special circuit for the exclusive use of one subscriber at $100 per year.

Electric Bell System Wanted for St. Patrick's Cathedral.

To the Editor of Electrical Review:

The committee of the board of trustees of St. Patrick's Cathedral are desirous of receiving proposals with plans, specifications, etc., to ring the 19 bells by electricity recently placed in position in the cathedral.

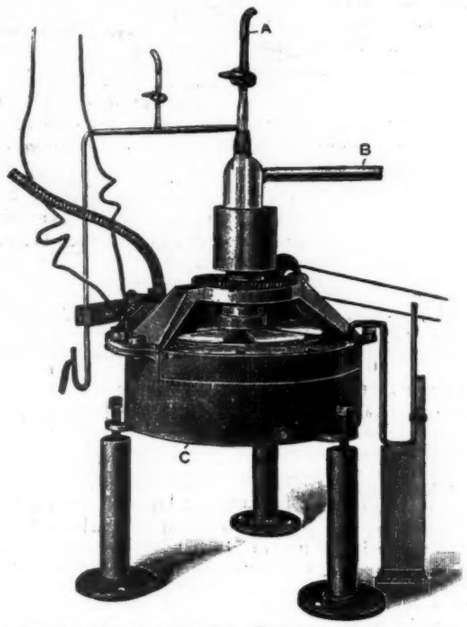
If any of your subscribers or others have a system or proposition they may desire to submit to do such work by electricity, or otherwise, the committee would be pleased to hear from them at as early a date as possible.

Yours truly,

CORNELIUS O'REILLY,
Chairman of Committee.
109 East Forty-fourth street.
New York, November 11.

The Rhodin Electrolytic Process.

The Rhodin electrolytic process for the manufacture of alkali and bleach, the invention of Mr. J. G. A. Rhodin, of Manchester, England, was recently demonstrated on a small scale in London by means of a model, an illustration of which is shown in the accompanying cut, taken from the London *Electrician*. Our contemporary understands that works are in process of erection for the commercial manufacture of caustic soda and bleaching powder from brine by this process. Referring to the illustration, which represents in all essential points the commercial form of the apparatus, the electrolysis of brine is carried on in the cast-iron cylindrical vessel C,



Working Model of Rhodin's Electrolytic Apparatus.

the bottom of which inside is lined with wrought-iron. A layer of mercury on the bottom forms the negative electrode, while the carbon electrode consists in a large number of short, vertical carbon rods projecting downwards from a rotating disk-shaped holder or cover, this cover being of vitrified earthenware. The brine is fed through the pipe A, and the spent liquor passes away through a pipe not shown in the figure. The layer of brine circulates between the upper surface of the mercury and the carbon rods, and as the earthenware cover rotates, the mercury is stirred so as to renew the surface exposed to the deposition of sodium.

The action of the cell is as follows: The layer of mercury forms a lute or seal with the downward projecting edges of the inner earthenware vessel, so that when the inner vessel is filled with brine, and the outer annular space is filled with pure water, no connection between the liquid contents of these two portions of the cell can possibly take place. When the electric current passes through the cell, the current passes from the lower end of the carbon cylinders to the surface of the mercury. The chlorine is given off at the surface of the carbon poles, and is carried away through the central tube B to the bleaching powder chambers. The sodium amalgam forms on the surface of the mercury in the inner portion of the vessel at the bottom surface of the brine, and passes partly by diffusion and partly by the mechanical agitation of the mercury, occasioned by the revolution of the inner vessel to the outer annular space, where the layer of water extracts the sodium in the form of caustic soda. The mechanical agitation is assisted by placing radiating vanes in the bottom of the containing vessel, and these conduct the mercury to the outer edge of the vessel.

In actual working, the iron vessel is heated externally to such a temperature that the liquid contents of the cell are raised to a little short of boiling point, and this not only prevents the absorption of a large amount of chlorine in the brine, but also very much increases the efficiency of the water in taking out the caustic from the amalgam, as well as reducing the electrical resistance of the liquid film between the lower surface of the carbon cylinders and the surface of mercury. In consequence of the low resistance in the cell, the voltage of the electric current which is required to drive the current through the cell is very small, and is stated to be not higher than 3.3 volts per cell.

The following are among the advantages claimed for Mr. Rhodin's electrolytic apparatus and process:

1. The process is a continuous one with a single anode chamber, costs less to construct, and gives results which far exceed any existing process.
2. The construction of the apparatus is such that it lends itself perfectly to the application of heat, a most important point, because the quantity of work which can be accomplished by the current when the electrolyte is hot is very much greater than when used on cold solutions.
3. The total absence of any rocking motion, no pumps or circulation of mercury.
4. There is practically no loss of mercury.
5. The high efficiency obtained.
6. The low potential necessary to effect decomposition.
7. The ease of renewal of anodes and the minimum destruction of same.
8. The apparatus, in addition to its use for the extraction of metals, soda, potash and other alkaline salts, can also be successfully used for the electrolytic production of a large number of other chemicals, such as nitric acid, chloroform, naphthaline, nitro-benzol, aceto-acetic ether, etc.

A Telephone Award.

The Electrical Review is informed that the American Electric Telephone Company, of 171–173 South Canal street, Chicago, was the most successful competitor at the Tennessee Centennial Exposition, which has just closed, receiving the highest award for meritorious apparatus in the way of telephones and switchboards. The American Company is to be congratulated on its success at Nashville, as it follows up in a most satisfactory manner to the company the previous successful competition at Atlanta, at which exposition it also received the highest award.

AMERICAN ELECTRICAL ENGINEERING IN EUROPE.*

BY ROBERT P. PORTER.

In visiting 25 of the leading European cities last Summer, it was a matter of gratification to find how rapidly American electrical engineering is pushing its way, not only in England, but in every direction on the Continent. In London, Dublin, Cork, Bristol, Coventry, Paris, Berlin, Hamburg, Brussels, Aix-la-Chapelle, Dresden, Vienna, and as far southeast as Budapest, I found American electrical engineering had been practically adopted for the street-car systems. In fact, wherever a community was breaking away from omnibuses, or those night-mares of street transportation, the hideous steam tram cars, there I could easily discern the ingenious hand of American enterprise. Nay, more than this, for, as a rule, I met in charge of these works either our own countrymen, or foreign engineers who had spent years in the United States in our great electrical establishments. In addition to the transportation interests, there are three other distinct lines of electrical industry in which we may safely be said to lead if the expert statistics count for anything. First, mining appliances, which include pumps, locomotives, hoists, blower and kindred devices; second, appliances for the transmission of power, including the alternating-current system, dynamos, transformers for producing high or low voltage, and other power machinery, and, third, telephone, counting and electric light appliances. The field for this sort of enterprise is practically unlimited, and it would be hazardous to attempt a forecast of what it may become within the next 25 years. Europe is only just beginning to sample the advantages of the electric street car and the light railway propelled by electricity. Of the 7,500 miles of tramways in all Europe, including European Russia and Turkey, and of nearly 10,000 miles of track, not much over 2,000 miles in 1896 were electrical. It is certain that horses, steam and cable grips must go, and in their place will come electricity and compressed air. America leads in both these branches of industry and in all methods of street transportation. To merely supply the necessary change of motor power for Europe, we have a mileage equal to half the electric mileage of the United States. This, however, gives but a meager idea of the possibilities, because Europe, with a population of 300,000,000, will not long be content with half the miles of street railways which we have in the United States to serve a population of 72,000,000. There is not only a field here awaiting American enterprise, but also capable of great expansion if properly worked.

In a recent and very interesting article on the large exports of electrical appliances, the New York *Journal of Commerce* calls attention to the imperfect classification of the Bureau of Statistics in relation to electrical machinery and appliances of all sorts. It is difficult, as matters now stand, to give complete statistics on the subject, though a better classification, I believe, is promised for the year 1898. The only heading under which comparisons can be made with exports during recent years is that of "instruments and apparatus for scientific purposes, including telegraph, telephone and other electric" supplies. These figures show total exports valued at $324,600 for July (the latest detailed statement issued by the Bureau of Statistics), which, however, indicates an increase of $143,144 from the July, 1896, record, while for the seven months ending with July the value of the exports reached a total of $2,043,802, representing an increase of $480,909 over the corresponding period of last year. Following are the figures for the seven months, showing the countries to which the supplies were shipped:

United Kingdom	$264,096
France	178,885
Germany	186,325
Other Europe	210,185
British, N. A.	200,934
Central America and British Honduras	63,606
Mexico	190,155
West Indies and Bermuda	77,727
Argentine	107,409
Brazil	81,954
Other South American	97,550
China	6,225
Japan	101,924
British Australia	48,591
Other Asia and Oceanica	50,219
Africa	177,943
Other countries	114
Total	$2,043,802

Among the items not included in the foregoing table is the important item of electrical machinery. Prior to July, 1897, the Bureau of Statistics did not state these articles separately; they have now decided to do so.

This is a matter to rejoice over, because we shall soon be able to watch with accuracy the extension of American electrical engineering in its broadest sense into the markets of the world.

Before referring to some specific instances of important American achievements, it may be well to call attention to some facts in relation to the growth of electrical undertakings in the United Kingdom, bearing in mind the fact that so far England and her possessions are our greatest customers in this particular line of manufacture. The bearing of this must not be underestimated, because if we can thus in part supply the British market, it would indicate that we have a fair chance to compete with our greatest engineering rivals for the other markets of the world. Indeed, the fact may be said to have already been recognized, and the superiority of our workmanship attested by expert English authority. The *Engineer*, of London, for instance, says:

"We have gone to the United States to get elevators for the Central Railway of London, and now we have to look to the same side of the Atlantic for the electric plant with which this traffic is to be worked. We are unable properly to equip an electrically worked tramway, and until our manufacturers take the trouble to teach their hands how to provide new machinery, the large and increasing contracts for this industry must be given to Americans."

Such comment as this, though made in that peculiar, carping spirit which Mr. John Bull assumes when obliged to admit American superiority of workmanship in anything, should nevertheless encourage those interested in American electrical enterprise. They should take heart and push the harder, and win for this country not only the reputation for the most ingenious appliances, but the best made also. The quality of the English-made articles has been such an old song and dance of the British competitor, that people have come to believe it long after it has been put on the shelf, with other figments of imagination, as old fiction. England, of late years, has taken up the electrical industries vigorously, and in 1896 her electrical undertakings may be thus stated:

	Nominal Share Capital.	Companies. Subscribed Shares.	Companies. Capital. Debentures.
Telegraph	$126,484,400	$ 114,896,535	$32,290,160
Telephone	30,175,000	24,203,220	8,211,020
Electric'l S'pply	27,717,500	19,996,085	6,560,015
El'ctric Tr'ction	54,494,150	25,520,990	2,282,605
Manufacturing	41,283,190	25,884,245	6,449,900
Miscellaneous	24,666,625	12,674,410	1,318,715
Total	$304,770,865	$ 223,173,185	$47,132,415

	Municipalities. Loans Authorized.
Electricity Supply	$9,389,910

While England is in fairly good position to supply telegraph and lighting enterprise, those who know most about the state of the enterprise, admit that she is behind the United States and even the Continent in ability to meet the demands where electricity has been applied to what they call their tramways. In America and on the Continent of Europe, English authorities admit there has been during the last few years a general movement in the direction of substituting electrical power for horses, and there are many indications that England is now following the lead of other countries in this respect. There are at present about 100 miles of electrical railways and tramways in operation in the United Kingdom. The first of these, the Portrush to Giant's Causeway line (eight miles), was opened as long back as 1883, and the more important of the others are:

Bessbrook and Newry tramways opened 1895, 3¼ miles.
Blackpool tramways opened 1896, 5¾ miles.
City and South London Railway opened 1890, 3¼ miles.
Guernsey tramways opened 1891, 2¾ miles.
Leeds tramway opened 1891, 3¾ miles.
Liverpool overhead railway opened 1893, 6 1-3 miles.
South Staffordshire tramways opened 1893, 7¾ miles.
Douglas-Laxey tramways opened 1894, 7 miles.
Bristol-Kingswood tramways opened 1895, 4¼ miles.
Snaefell mountain railway opened 1895, 4¾ miles.
Coventry tramways opened 1895, 5¾ miles.
Dublin southern tramways opened 1895, 8 miles.
Hartlepools tramways opened 1896, 2½ miles.

This is not a record which will admit of comparison with the nearly 14,000 miles of electrical street railways in the United States, or with the progress of electric traction in many of the continental countries; but the fact that there are now in England about 200 miles of electrical tramways and railways projected, and partly under construction, besides others in contemplation, shows, even to the British mind, that a recognition of the advantages of electric traction is not longer confined to foreign countries. Nearly all of this has been contributed by American firms. An American firm recently secured the contract for the Central London Underground Railway, one of the most unique enterprises of the times. Some of the electrical tramways about to be constructed are lines previously worked by steam or horses, while many of them are extensions of existing tramways, and new lines in districts not hitherto served by tramways.

Those engaged in the manufacture of street railway supplies will see from the following quotation from an English electrical authority that the Briton has at last awakened to the importance of this branch as a British industry:

"Considering that during the past six years tramways of all kinds in the United Kingdom have increased by only about fifty miles, the new developments must be regarded as considerable; nevertheless, the experience of other countries and tramway statistics generally — indicating as they do a very wide scope for the application of electricity—enable us to look upon the new electrical enterprises referred to as merely the inauguration in this country of the general adoption of this form of traction. The law in regard to the promotion and working of tramways in this country has lately been modified in a way facilitating the use of electric power."

Last August, when, in Liverpool, the town council had up for discussion the inauguration of electric motor power for the recently municipally acquired city tramways, the chairman of the committee, a man familiar with the condition of the American electrical industry, proposed a well known American electrical engineer to take charge of the work. The highly intelligent and unprejudiced Town Council entered objection on the ground that England should be able to furnish its own experts for such undertakings. The proposition was turned down. Subsequently, the chairman of the committee, who knew what he was about, resigned. Then a compromise was effected, and it was decided that a British engineer should be in charge, but the American should be employed as "consulting engineer." But it takes two to make a bargain, and the American engineer declined to act. That is the last I heard of the incident, but it all points to the fact that our kin across the sea do not intend to let us have a walkover in this, our strongest line of engineering. Still, we are in the field now firmly, and with courage and enterprise there is no reason why we should not continue to occupy the first position in all matters electrical. There are great opportunities for us, not only in England, but all over the world, for the new century will inaugurate the age of electricity, and the nation of its birth and first utilization should rightly hold first place in all appertaining thereto.

*From the Philadelphia *Inquirer*.

LITERARY.

Walter A. Wyckoff, the college man who became a day laborer, concludes the first part of "The Workers" in the Christmas *Scribner's*, with a description of life in a logging camp in the mountains of Pennsylvania. During the year 1898 there will appear in *Scribner's* Mr. Wyckoff's narrative of his experiences in the congested labor market of Chicago. He was there in the World's Fair year.

Considering the importance of his work and the hardships he endured in pursuit of it, there has been singularly little written about the young Swedish explorer, Dr. Sven Hedin. Mr. R. H. Sherard has prepared a full account of Dr. Hedin and his discoveries and adventures, based largely on conversations with him, and it will be published in *McClure's Magazine* for December, along with numerous illustrations from sketches and photographs made by Dr. Hedin himself during his journey.

Whitmore—Marcellus-Buttrick.

Mr. Walter G. Whitmore, of the General Electric Company, and Miss K. Marcellus-Buttrick, of Bay Ridge, N. Y., were married October 12 last at the home of the bride's parents. Mr. Whitmore is a graduate of the Massachusetts Institute of Technology, whence he went to Chicago and was for some time with the Chicago Edison company. In 1889 he joined the engineering staff of the Edison General Electric Company, and after the consolidation of the interests which became the General Electric Company, he was placed in charge of the entire electrical construction work of the New York office of that company, with the title of local engineer. Mr. and Mrs. Whitmore carry with them the best wishes of the ELECTRICAL REVIEW and of all his many friends in the electrical fraternity.

New Motor-Starting Apparatus.

The Automatic Switch Company, Equitable Building, Baltimore, Md., has recently placed upon the market a new non-magnetic automatic starter, shown in the accompanying illustration, Fig. 1. It is stated to be the acme of simplicity and durability and is this company's latest development in the line of motor-driven starters. Its action is rendered automatic by the use of centrifugal force. The powerful movement of the contact rod is the result of a positive thrust taken directly from the pulley and is not affected by variations of speed when starting. A subsequent overload of the motor will have no tendency to replace the starting resistance in circuit. The absence of dash-pots, solenoids, magnets, and latches of any kind are commendatory features of this apparatus. It is especially designed for use on any class of work where it is unnecessary to restart a motor before it has come to a standstill. The Automatic Switch Company's motor-driven starters are particularly adapted to pumping work. The method of operation is that of belting directly to some suitable moving part of either the motor or the pump. This makes the removal of the resistance entirely dependent upon the speed with which the pumping outfit starts. In this way the current can not rush on the motor armature more rapidly than it is prepared to receive it.

In Fig. 2 is shown the Automatic Switch Company's new quick-acting switch. It is designed for use with their different types of automatic starters and is fully covered by the company's patents. The construction is such that a pull of six or eight pounds will operate the circuit closer instantaneously in either direction, irrespective of the speed with which the handle is moved. In view of the fact that the service for which this switch is designed is of an exacting and continuous character, the switch is built in a most substantial manner.

Fig. 1.—Non-Magnetic Automatic Starter.

Fig. 2.—Quick-Acting Switch.

The Athol & Orange, Mass., electric road has elected the following officers: President, Geo. D. Bates, Athol; clerk and treasurer, W. D. Luey, Athol; general manager, W. D. Smith, Athol; auditor, Warren M. King, Orange. These, with John W. Wheeler, Orange, A. F. Tyler and H. M. Slate, constitute the board of directors. The capital stock of the road is $60,000. It is bonded for the same amount, and has a surplus of $15,000. The dividends are eight per cent.

The "Barrows" Electric Vehicle.

A novel and what is likely to prove a practical form of three-wheel electric vehicle has been developed and is constructed by the C. H. Barrows Company, of New York. The vehicle has a one-horse-power motor, and 24 batteries aggregating 400 pounds in weight of the "Willard" type. The controller is in the forward part of the carriage under the operator's hand, near which is the handle, which, when raised, serves as a brake and also guides the carriage. Three hundred pounds of the battery are placed on either side of the forward wheel, the remaining 100 pounds under the seat. By putting the greatest weight of the battery on the driving wheel it is carried with less power than in any other way, and also allows the weight to be utilized for driving traction. The motor is geared by a two and one-half-inch rawhide pinion, direct to a 28-inch steel gear, bracketed to the rim of the wheel. The controller permits three speeds forward and two backward. It is said to be as thorough and reliable as those in use on trolley cars, having been especially designed for this work, and is instantly set to any desired speed up to the maximum—12 miles an hour. Under ordinary circumstances, the inventor of the vehicle says it will run about three hours, or 30 or 40 miles, on one charge.

The "Barrows" Electric Vehicle.

An electric railroad is talked of to the Grand Canyon, Ariz. Also the building of a fine hotel at the canyon's rim.

ELECTRIC RAILWAY NOTES.

The Atchison, Kas., street cars will be equipped with vestibules, in accordance with the new Kansas law.

The street railways of Toronto, Canada, on a 30-year lease from the city, pay $800 a mile to the city for every mile of single track.

The Belle City Railway Company, of Racine, Wis., has mortgaged its plant for $250,000. Of this amount $25,000 will be used for improving the road.

In Montreal and Toronto, Canada, fares on street cars are at the rate of six for 25 cents, or eight fares for 25 cents between 6 and 8 A. M. and 5 to 6.30 P. M.

Charles McElhany has sued the United Traction Company, of Pittsburgh, Pa., to recover $5,000 damages for alleged personal injuries received in a street car collision on Beaver avenue, Allegheny.

The citizens of Council Bluffs, Iowa, will vote on a proposition to grant the Manawa Railway Company a franchise to extend its electric lines and build a power-house. The company contemplates the expenditure of $300,000.

The horse railway system of the city of Dublin, Ireland, is about to be superseded by the electric trolley system, and, after a careful survey of English, German and French methods, it has been decided to adopt the American system. The cost of the electrical equipment of these lines, it is estimated, will be from $1,250,000 to $1,500,000.

Joseph Phelie, whose leg was broken in two places in a collision of electric cars, October 25, has brought suit for $10,000 damages against the Burlington, Vt., Traction Company. At the time of the accident Phelie was a passenger on car 13, and was riding on the front platform. Immediately following the accident the company pasted notices in all its cars forbidding passengers from riding on the front platform.

D. A. McKibben, J. M. Laing, J. L. McKibben and G. W. Kierstad, of Leavenworth, Kas.; S. G. Wade and J. C. Willard, of Cleveland, Ohio, have chartered the Kansas City & Leavenworth Electric Railway Power and Mining Company. They propose to connect Atchison, Leavenworth and Kansas City by an electric railway, to furnish light, heat and power to the three cities and maintain a coal mining industry as well. The capital of the company is $6,000,000.

At the annual meeting of the Norwich, Ct., Street Railway Company the following officers were re-elected: President, Billings P. Learned, New London; treasurer, William A. Tucker, Boston; secretary, W. L. Adams, Norwich. The stockholders chose the following board of directors: A. H. Brewer, John Mitchell, Costello Lippitt, C. L. Hubbard, Norwich; B. P. Learned, New London; W. A. Tucker, Boston, and John F. Perry, Brookline, Mass. The board remains unchanged.

It is said that there is a project on foot to extend the trolley system, which has been built from South Bethlehem to Hellertown, to Quakertown, Pa. The matter is being pushed by New York parties in connection with local capitalists. It is also reported that a similar project is on foot to extend the trolley which is being built from Willow Grove to Doylestown on up through Bedminster, Blooming Glen, Sellersville, Perkasie to Quakertown, and connect with the system from Bethlehem, and thus make a continuous route from Philadelphia to Bethlehem and Allentown.

The East McKeesport Railroad Company, of Allegheny County, has been incorporated, with a capitalization of $35,000. The line of the new company will run from the end of Fifth avenue, McKeesport, eastward through Versailles township, North Versailles township, East McKeesport and Wilmerding, ending at the Pennsylvania Railroad at the latter place. The officials are: President, W. B. Armstrong, Pittsburgh; directors, R. F. Ramsey, J. P. Cavanaugh, Curtis Mitchell, Walter Roe, W. H. Hegerman and T. W. Durker. The road will be practically a part of the United Traction Company. The new line will compete with the McKeesport, Duquesne & Wilmerding company, and it is said that a traction war will be precipitated.

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CHANGES for advertisements must be in this office by Friday noon for the following week's issue.

NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, NOV. 17, 1897.

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The Navy Department is perfecting a system of communication along the Atlantic coast by means of which naval vessels lying off shore may communicate with the land. The system includes semaphore signals and telegraph and telephone lines. The existing telegraph and telephone system of the Life Saving Service will be utilized in the new scheme. A feature is the establishment of a government line to Washington, which will be connected with the coast system.

In spite of the authoritative source (for which we have respect) from which our affirmative information comes, we do not hesitate to express the belief that the manufacturers of rubber-covered wire, as a whole, are disinclined to form a combination.

The City Council of Philadelphia last week passed an ordinance, which the Mayor has signed, by which the United Gas Improvement Company will secure a lease of the municipal gasworks, so long an expensive luxury to the city. It is understood that the gasworks will eventually be operated solely for the manufacture of fuel gas, to be sold at a price between 60 and 75 cents per thousand feet. The same syndicate in control of the United Gas Improvement Company controls the Pennsylvania Heat, Light and Power Company, the largest electrical corporation in Philadelphia. It is but natural to assume that these two corporations will be carried on in harmony—one to supply fuel and the other light. Considerable opposition to the lease of the gasworks has developed in Philadelphia, as it is alleged that the city will receive no returns on the lease under the plan outlined above.

Gen. A. W. Greely, chief signal officer of the United States Army, gives some very interesting statistics in his annual report to the Secretary of War. He states that at the close of the year ended September 30 last the permanent military telegraph lines operated by the signal corps aggregated 802 miles in length, exclusive of a short cable in New York Harbor. The principal work of the year done by the signal corps was in connection with the military operations against the Indians in Arizona. Highly satisfactory experiments were there made with the combined telegraph and telephone apparatus devised by Capt. James Allen, of the corps, which General Greely states is distinctly superior to any previously constructed, and answers every requirement. General Greely says that an operator can easily carry a combination telegraph and telephone office, and while one soldier telegraphs a message, another may, over the same wire, talk telephonically with another station, the two receiving operators hearing only their own messages. The outfit weighs but 16 pounds, including batteries, and has been rigidly tested up to more than 600 miles. General Greely regards this as the most notable advance of the year, and observes that its importance is not confined to the field work of the corps, but its useful application may be made world wide.

THE RUBBER-COVERED WIRE POOL.

One of the chief topics of discussion in the electrical industry and financial circles, since the issue of the ELECTRICAL REVIEW one week ago, was the announcement of the proposed combination of the rubber-covered wire manufacturing companies. The leading companies in this branch during the past week have received many large orders, the opinion apparently prevailing among the consumers that the success of the proposed consolidation would mean an advance in the price of the product. Our information is to the effect that several companies are now working overtime to keep up with their orders.

The theory of the organization of these wire-makers into one company, as we understand it, is; first, that the new company would be able to give a fair profit to the present manufacturers by reducing the expenses of running the business as a whole, and, secondly, to supply the user with insulated wire at no advance over the present prices, even, perhaps, lowering the price. There is some doubt, however, this week as to the success of the project, as so many heretofore opposing interests must necessarily be considered. In round figures the amount of business annually carried on by the rubber-covered wire field in America is from $5,000,000 to $6,000,000, represented by about 20 manufacturing companies. We present below a partial list of these companies:

John A. Roebling's Sons Company, Trenton, N. J.

Washburn & Moen Manufacturing Company, Worcester, Mass.

Okonite Company, Limited, New York.

W. R. Brixey (Kerite), New York.

American Electrical Works, Providence, R. I.

General Electric Company, Schenectady, N. Y.

The New York Insulated Wire Company, New York.

The India Rubber and Gutta Percha Insulating Company, Yonkers, N. Y.

The Safety Insulated Wire and Cable Company, New York.

Bishop Gutta Percha Company, New York.

The Eastern Electric Cable Company, Boston.

Simplex Electrical Company, Boston.

Indiana Rubber and Insulated Wire Company, Jonesboro, Ind.

National India Rubber Company, Bristol, R. I.

The Standard Underground Cable Company, Pittsburgh.

Crescent Insulated Wire Company, Trenton, N. J.

Crefeld Electrical Works, Boston.

National Conduit and Cable Company, New York.

To bring all these interests, and others, perhaps, together in one large corporation is a task of considerable magnitude, and to-day, from the best information the ELECTRICAL REVIEW is able to obtain, it is evident that there are a good many snarls yet to be untangled and a great many more problems to be solved than were at first anticipated. It was hoped to have the amalgamation take place by the first of January next. The outcome will be awaited with interest, and what it may be will depend very largely on the view taken of the whole question by the stockholders of the various companies when the matter is properly submitted to them.

Wall Street and the Electrical Stock Market.

Wall street spent considerable time this week in taking fright at the baseless rumors invented and circulated for the purpose of depressing the values of securities. The demoniac ingenuity displayed in concocting these fabrications was marvelous. Relations between this country and Spain, involving the Cuban issue, were the basis of much of the disquieting talk, and when the administration at Washington felt called upon to allay fears, which had become quite acute in the business world, by stating that at no time since the real issue was defined had the relations between the two countries been as pacific as now, those interests who threw over their securities hastened to buy them back. This, together with the covering of contracts, restored values to about their ante-election level. The market at the moment is professional, and is not regarded by good judges as likely to develop any definite tendency until after Congress convenes and prospective legislation shapes itself.

The penny press has been unusually active this week in circulating rumors calculated to destroy values. The electrical field did not escape this blighting attention. Pros and cons of the "wire trust" were canvassed, expanded, magnified and distorted almost beyond recognition. The prize story, from the standpoint of sublime asininity, was printed under scare heads, announcing to the world that Mr. J. P. Morgan was preparing to fight the General Electric-Westinghouse combine through the Sprague Electrical Company, which he had just organized in Jersey City, and that the General Electric was fortifying itself so it could fight back by joining the Rubber-Covered Wire Trust. Comment is unnecessary.

It might be said in this connection that Wall street generally believes that Mr. Morgan is still very heavily interested in General Electric and that he is the moving spirit in the Sprague company.

I am told that the financing of the Sprague company, which involves the absorption of the Interior Conduit and Insulation Company, is making satisfactory progress.

I notice quite a revival of interest in electrical shares in the Street this Fall, and attribute it to the heavy business which the manufacturing companies are doing, and the financing of various projects which are before the public or which are about to appear. A number of these have been reported in this column and others will be canvassed at the proper time.

I am in touch with the organizers of the Rubber-Covered Wire Pool, which is holding continuous session with a view of arranging details. I am told that one of the most difficult problems to solve is the equitable adjustment of interest, which manufacture the raw wire and at the same time insulate it. It is probable that this issue will finally be decided by an agreement on the part of such manufacturers to discontinue their insulation work in consideration of contracts to supply the uninsulated wire to other manufacturers.

A development of financial interest in the electrical business is the action of the Welsbach Light, of Philadelphia, in reducing the price of its lamps. Last year the reduction was 25 cents per lamp and now it is 90 cents, making the price $1.40 to consumers. If the buyer puts up the lamp, the price is $1.25.

Electrical stocks closed the week at or above last week's level. Fluctuations were sympathetic with the general market. General Electric low price was 31⅛, and the close to-day was 33. In Boston, Bell telephone advanced from 251 bid early in the week to 255 bid, and 257 asked, at the close. Erie telephone gained one point to 70, and New England telephone was nominally 125. In Philadelphia, Electric Storage Battery slumped from 25½ to 22½, but partially recovered. Pennsylvania Heat, Light and Power was steady at 16 to 16½. BAIN.

NEW YORK, November 13.

A Cross-Country Electric Road on Long Island.

The Cross-Country Railroad Company to operate in Kings and Queens counties, with the principal office in Brooklyn, N. Y., has been incorporated. The road is to be built as a double-track surface road, and is to be operated by electricity. The capital stock of the company is placed at $250,000, and the directors for the first year are Joseph McClean, Andrew A. Halsey, Theodore Bernard, Charles H. Kelly, George Keller, James Cromley, Francis Bacon, James Irwin and Charles Brandon, all of Brooklyn.

It is said that some of the principal men in the Nassau Railroad Company are behind the new corporation, but that the only direct interest the Nassau has in the new road is as a possible feeder to its lines.

The route applied for by the new company will largely run over private property, which, it is understood, has already been secured. It is proposed to connect the villages of College Point, Whitestone and Flushing with Jamaica and the Twenty-sixth Ward of Brooklyn, where by a change of cars to the Nassau surface line or the Brooklyn Elevated Road, passengers will be able to reach the Bridge and ferries. Most of the territory can not be now reached by trolley, and is also distant from the Long Island Railroad.

It is said that the men interested in the new company propose to construct other trolley lines south of Jamaica, which will give the north shore and Brooklyn connection with the seashore.

The receivers of the Home Telephone Company, of Baltimore, recently applied to the court for authority to issue $30,000 of receivers' certificates, with which to raise money to complete work in progress and to preserve the company's plant.

Public Ownership.

[*From Leslie's Weekly.*]

There is much talk nowadays of public ownership of everything, from gas and water, to street cars, telegraphs and telephones. In theory, this is no doubt very pretty, but in practice we have an idea that, under present conditions, at least, it would prove to be expensive and even dangerous.

If our municipal corporations were as well managed as they should be, if the political machines were already as effectually smashed as in good time they will be, then the public ownership of all these semi-public properties might be very well indeed. But at present we have much more property publicly administered than can be looked after with either economy or skill.

As a general thing the streets in American cities are badly paved, badly drained, and badly cleaned. On the other hand, the street cars, the street lights, and the telephones—all generally under private management—are usually very good.

Whenever we hear an argument for public ownership we are usually told to look at the English example of the effective working of the telegraphs and telephones by the post office department. But even in England they put up jobs on the best post office department in the world, and private owners secure from the public the most profitable privileges that are to be had. In 1892 Sir James Fergusson was Postmaster-General of Great Britain and made a contract with the National Telephone Company, turning over to that corporation the very profitable business of the local telephone exchanges in the great cities, and leaving to the post office department the operation and maintenance of the expensive trunk lines between the different towns. In 1897, when the Duke of Norfolk has become Postmaster-General, Sir James Fergusson is the director of the National Telephone Company. So, even in England we see that there are grave dangers that jobs may be put through to the injury of the public and the profit of monopolists.

In this country the general government, and the municipalities as well, have bitten off quite as much as they can comfortably masticate.

National Electric Light Association.

A special meeting of the executive committee of this association has been called for Monday evening, November 22, at the Holland House, Fifth avenue and Thirtieth street, New York city, at which time matters of very considerable importance to the association will be discussed.

American electric launches are evidently appreciated at their true worth in European countries, judging by the large number of orders recently received for them. Among late purchasers are the Czar of Russia, Baron Rothschild and the DeBeers Consolidated Mining Company in South Africa.

The Fluoroscope in Court.

For the first time in the history of the law the fluoroscope and a complete X-ray outfit were brought into service in a case in the Supreme Court in Brooklyn, N. Y., last week. The parents of a nine-year-old boy are suing the Atlantic Avenue Railroad Company for $10,000 damages for injuries alleged to have been sustained by the boy through the negligence of the street railway company. The suit is based upon the allegation of the plaintiffs, supported by the testimony of a radiograph, which, they claim, proves that the boy's arm and shoulder were fractured. In the course of the trial the boy was examined in court by means of the X-ray outfit and fluoroscope. An interesting phase of the occurrence was that the boy was divested of his jacket and shirt before being examined by means of the Crookes's tube and fluoroscope. The operation could have been as well performed with the boy fully clothed.

PERSONAL.

Walter P. Phillips and Albert L. Suesman, who were prominent in the management of the United Press, have entered the service of the Columbia Phonograph Company. Mr. Suesman has gone to Chicago, and Mr. Phillips will make his headquarters in New York.

Death of Col. John Jameson.

Col. John Jameson, who was well known in telephone circles, died at his home in Brooklyn, N. Y., on Sunday last of a spinal disease. In 1884 he was appointed general superintendent of the government railway mail service. He was an expert in electric subway construction, and had been connected with that kind of work in New York city since its inauguration. Colonel Jameson was a director of the New York Telephone Company and other corporations at the time of his death.

Meeting of Incandescent Lamp Makers.

A meeting of the manufacturers of incandescent lamps was held in New York November 11 and 12. Only routine business of a current nature was discussed. Mr. J. H. Rhotehamel, of the Columbia Incandescent Lamp Company, and other western incandescent lamp manufacturers were present.

A Substitute for Rubber.

A press dispatch from Denver, Colo., dated November 15, states that the Right Rev. Dean H. Martyn, of that city, has invented a substitute for rubber, which can be manufactured for five or six cents a pound. The new material is called perchoid.

Laconia Car Company Reorganized.

Laconia Car Company, of Laconia, N. H., has been reorganized. The shops will probably be put in operation December 1, and between 600 and 700 men will be employed. The building of electric as well as steam cars will be carried on.

DISCIPLINE OF EMPLOYES.*

BY GEORGE H. DAVIS.

(Concluded from page 233.)

Based upon the above, applicants having the highest standing are given the positions as extra motormen and conductors as fast as vacancies occur. If inexperienced men are employed at all in the service, they are taken on as conductors and kept in this position for at least six months, and for three months they work without pay. After this work as conductors they break in as motormen, with motormen already in the service who have the highest standing. After six months' service of this kind, they are given their examination and are placed on the lines of the company as extra motormen. To determine the relative standing of employés, a system of marking has been adopted, which takes into account, first, the general quality of a man's work, according to the judgment of the foreman in charge; second, the value of the special acts in his service as reported by foreman, and marked in the record of the employé, according to a fixed scale kept in the main office. To illustrate, in the department of transportation, for motormen and conductors, blanks are prepared which contain the names and numbers of every motorman and conductor in the service. At the head of these blanks there is a personal letter addressed to the general manager, which is as follows: "Dear Sir—According to my best judgment, the quality of service rendered by each employé coming under my observation in my department of the service, being fairly and honestly estimated for to-day, is as follows:" Opposite the name of the motorman or conductor there is a blank space left for the mark of the foreman. Each foreman, inspector and starter has one of these blanks, and marks after the conductor's or motorman's name the quality of his work for the day, and sends the blank to the main office the next morning. He marks "v e" for very excellent, "e" for excellent, "g" for good, "f" for fair, "p" for poor and "v p" for very poor. In the main office these marks are reduced to an arithmetical basis and placed in the record of the employés. In determining the marks to be placed in the record, the marks of all foremen, inspectors and starters for a given man are added and the mean taken, which is considered the final mark. In this way the average judgment of perhaps 10 different foremen in regard to an employé's work is obtained.

The marking of the special acts of an employé is on a more definite basis, and has no connection with the judgment of the foremen, inspectors and starters. They simply report the acts. Based upon bulletins, instructions or orders issued, and also upon experience in good railway practice, two lists of acts of employés are made, one delineating all the desirable or commendable features of the service of an employé, the other all the undesirable or intolerable features. For each of the acts in the commendable list, a certain number of points of merit are always given. Similarly for each of the acts in the uncommendable or intolerable list, a certain number of points of demerit are given. To illustrate more thoroughly, a few of the acts mentioned in the merit and the demerit lists may be given. In the merit list for motormen we have: Skillfully avoiding accidents, assistance on minor road repairs, suggestions as to best speed of cars, helping to clear blockades, assistance rendered on special occasions, obtaining names in accident cases, etc. In the demerit list for motormen we have: Running with hands off of brake and controller, looking around while car is in motion, not running on schedule time, feeding car too fast, untidy condition of dress, accidents to persons (serious, medium, slight injury), accidents to cars (serious, medium, slight injury), accidents to vehicles (serious, medium, slight injury), etc.

In the merit list for conductors we have: Complete and perfect accident reports, reports as to where the company is gaining or losing traffic, reports as to what passengers say, kindness to aged and infirm persons, assistance rendered on special occasions, obtaining names of witnesses in accident cases, etc. In the demerit list for conductors we have: Incomplete accident reports, insufficient number of names in accident cases, no change, not announcing route, streets and transfer points, leaning against door, conversing with passengers inside, short register, bunching fares, ringing up fares when officer boards car, register not turned, shorts and overs, untidy condition of dress, etc.

The marking for general daily reports, together with reports of special acts, is kept in a record book, which allows four pages to each employé, each of the pages being numbered to correspond with the employé's badge number. The first two pages of each employé's record are made up in blank form, allowing space for each day of the month, together with each month of the year. The next two pages are plain ruled, and are used for explanations of each mark given. The margin of the first page is divided into blank form, giving the information regarding an employé, which is usually covered by headings placed in application blanks. Each month the points of merit and demerit are balanced. If an employé's record falls below zero, he is discharged. The estimation of the value of a man's services, according to the above method, is based upon two foundation principles, one being a check upon the other. Every officer of the company has his own ideal, and, due to the fact that every human being sees the world from a different standpoint from every other human being, the chances that an employé's work is estimated upon by the thoroughly experienced railway operatives, the average judgment of these men should be correct. Acting upon this principle, favoritism among officers is almost completely eliminated. Some men might be favorites with two or three officers, due to outside circumstances, but this would never extend to the whole 10, or even five. A car operative's life is not filled with opportunities to render brilliant services in behalf of the company, and for this reason some method of estimating his work must be adopted which will give credit for every day's efficient, satisfactory conduct. The method employed has proven by experience to be simple, just and effective.

The second principle used in the estimation of the quality of the service is embodied in the fact that a more just and unbiased decision can be reached in regard to the merit or demerit of an act if judgment has already been passed on an exactly similar case. Now, by the system of marking mentioned, a list of all possible cases is prepared, and judgment passed upon them by the general officers of the company, the relative number of points of merit and demerit being fixed. Now, when an act occurs, it only remains to locate it in the list to pass judgment. Hasty or snap judgment passed in a fit of anger on an employé's offense usually results in the greatest injustice to the employé. The reaction among employés is such as to practically destroy their confidence in the company, and always proves detrimental to the best interests of the road. Promotions among motormen and conductors are always made according to their standing as determined by their records without examination. The "extra" motormen or conductors having the best record are promoted to a "swing" run. Similarly, the "swing" men to "half-and-half," and the "half-and-half" men to "straight-day" runs. "Straight-day" motormen and conductors are promoted to the positions of inspectors, starters and transfer agents on their records alone. No account whatever is taken of the relative date at which the employé entered the service. As mentioned before, the same general methods are employed in all departments, but, owing to the fact that the transportation department is the most important of all, the details of the civil service system are carried out most thoroughly in this connection. To insure perfect accuracy and fairness, each employé is invited to examine his own record or that of any other employé at any time. He is also at liberty to inspect the scale of marking by which the records are adjusted.

It is evident that a system of bookkeeping resulting from the methods as described would be more expensive to maintain than other forms of discipline which have been generally employed. It has been found, however, that the extra expense attached to this system is trifling in comparison with the results obtained. The larger a street railway the more thoroughly applicable are civil service methods. This comes from the fact that on small roads the general officers of the company come more in contact with the employés, thus being able to judge personally of the quality of their service, regardless of records kept, and also on small roads the same employé may fill several positions in comparison with a thoroughly classified organization, which must be maintained in large street railway systems. Regarding the general results of a thoroughly enforced competitive system, it may be stated that there is as much difference in the quality of work rendered by men engaged by a road operated on a competitive basis of promotion, and a road on which promotion is made according to the position of a man's name in the list, as there is between two railway companies, one having a monopoly of the traffic and the other having a direct paralleling competitor. It has been found by experience in the operations of roads where employés work on a competitive basis, that they invariably do their best. They are gentlemanly in their treatment of passengers, neat and tidy in their dress, and skillful and prompt in the discharge of their duties. They take great pride in the company's fine equipment, its large business, its management and principles of fair dealing. They never fail to praise the company and its service to patrons, and are only too glad to answer, in behalf of the company, any adverse criticism offered by patrons or the public. They feel from the start that their present and future positions in the railway business depend upon the quality of their work, and nothing else.

Legitimate competition is one of the most powerful incentives that can be employed. Men under these conditions are forced to make their best efforts. This is illustrated constantly in all professional, mercantile and manufacturing industries. The piece-work system in vogue in New England factories is only one method of competition by which a man is paid according to the quality and quantity of his work. On a competitive basis the standard of excellence is constantly being raised. When a large number of men are engaged in the same kind of work, there are always a few who will accomplish most extraordinary results, and their work stands as a most effective object lesson to the others. If a man has anything in him, competition will bring it out; if he has no redeeming features, then his services are not required. Another advantage of the civil service system is that it effectually debars all outside influence and eliminates the "bug bear" commonly designated among the men as a "pull." It also completely obliterates political interference, which is the greatest bane to the efficient services of American street railways. In conclusion, it may be stated that this system is not urged as a panacea for the ills of railway management, but is merely offered as a suggestion, with the hope that it may be of some slight assistance in improving the successful methods which have always been employed.

*Read before the American Street Railway Association, Niagara Falls, N. Y., October 22, 1897.

The New York Edison Company Issues a Circular.

The Edison Electric Illuminating Company of New York, through Mr. R. R. Bowker, has just issued to its customers a circular letter, of which the following is an abstract:

The directors of the Edison company have authorized reductions in the prices of current, as fast and as far as the margin above a fair dividend permits, in the belief that such reductions will broaden its field of operations, insure continuing increase of its success and make possible still further reductions. The reductions so far made have been chiefly to wholesale consumers, and particularly for long-hour use. Electric current can be generated and distributed in large quantities more cheaply than in small quantities.

In addition to adopting a new wholesale rate, the company now proposes to extend its discounts for long-hour use to smaller consumers—those using 5,000 or more incandescent lamp hours ($50 gross bills) per month. These discounts, which are given only for prompt payment, are five per cent on two hours per day average use of the installation, 10 per cent on three hours, 15 per cent on four hours, 20 per cent on five hours' use per day. This reduction will commence in bills rendered in November. It is hoped that the results of this reduction may justify an extension of the long-hour discounts to other and smaller consumers at an early date.

Some consumers have used gas for long-hour lighting and electric light only for short-hour use. The long-use discounts make it economical for consumers to use electric lighting throughout. Electricity, at wholesale rates, is already cheaper than gas, and more illumination can be had for the money, even at retail rates, from arc lighting than from the most improved gas methods; and as the hours and extent of incandescent use are increased, it will be more possible to make this form of lighting also as cheap as gas for the smaller consumers.

For long-hour users, the company is prepared to supply a mechanical meter with a recording dial which can be read by the consumer. The company, for some time past, has been investigating the various mechanical meters used here and abroad, and it is believed that the improved mechanical meter now adopted by the company carefully safeguards the interest of consumers. Customers not coming under the long-hour class, but desiring the immediate installation of a mechanical meter, can have the change made, as fast as practicable, in the order of application, on payment of the cost of the change.

The inclosed arc lamp, of which over 1,200 are now installed on the company's system, has effected a great improvement in arc lighting. These lamps are not included, like the old type of arc lamps, in the prices for current, but customers may obtain them through the Edison company, which withholds a portion of the discounts until the deduction covers the price of the lamps, which then become the consumer's property; or the customer may purchase them direct from the manufacturers. When owned by the consumers, 10 per cent additional discount is allowed from the price of current.

The use of the electric elevator, with its electrical, as well as mechanical, safeguards, is steadily increasing, and the extension of electrical power generally is shown by the fact that over 18,000 horse-power in motors is now connected with the company's system. Every consumer of power should investigate the advantages and economies of this application of electric current. The prices for power have already taken length of use into account.

Electric current is coming into increased use for heating and cooking, and though the cost makes these applications still somewhat of a luxury, electric cooking in small apartments and during the Summer, and the heating of bath-rooms and other small rooms by electricity will be found much more satisfactory and convenient than by the gas stove.

The company continues its practice of making its rates for the same class of service absolutely uniform, and of extending promptly to all of its customers any advantages it may offer to obtain new business.

The Edison company is now supplying its customers from five central stations and two annex stations, which include three storage batteries, each of these sources of supply feeding into the same network of mains. An Edison customer is thus guaranteed a continuous and steady service, such as no other source of electricity supply can assure. The company has to thank its customers for their co-operation in its steady increase of business, keeping it still the largest electricity supply company in the world, which increase has made possible the several reductions in rates so far made by the company, and should make possible further reductions until electricity becomes the cheapest, as it is now the best, of illuminants.

All Wrought Steel Pulleys.

The American Pulley Company of Philadelphia are the manufacturers of the all wrought steel pulley shown in the accompanying illustration. These pulleys are made exclusively of mild sheet steel, accurately rolled to standard gauges. No castings or forgings are used in their manufacture. The various parts are cut from sheet metal and cold-pressed into the required forms by machinery especially designed for the work. The various form parts are then assembled and so riveted together as to produce a pulley for which the following advantages are claimed: Strength and rigidity, rendering the all steel pulley practically indestructible; a weight two-thirds less than that of the ordinary cast-iron pulley; perfectly balanced and safe under high speeds. This pulley is rendered interchangeable by the use of steel bushings and will fit shafts of different diameters. Its selling price is said to be a little higher than the best wood pulleys now on the market, but much lower than cast pulleys.

All Wrought Steel Pulley.

The World's Telegraph System.

The total length of the world's telegraph system has now reached 7,900,000 kilometres (4,908,823 miles), exclusive of 292,000 kilometres (181,440 miles) of submarine cables. This mileage is apportioned as follows: Europe, 2,840,000 kilometres (1,764,790 miles); Asia, 500,000 kilometres (310,685 miles); Africa, 160,000 kilometres (99,419 miles); Australia, 350,000 kilometres (217,479 miles); America, 4,050,000 kilometres (2,516,548 miles). It will therefore be seen from the above that, notwithstanding the steady increase in the building of telegraph lines all over Europe, America leads and has almost double the mileage of Europe.

The net earnings of the Edison Electric Illuminating Company of Brooklyn, N. Y., for September were $27,285; an increase of $4,531 over the same month last year.

MILITARY TELEGRAPH AND TELEPHONE LINES.*

BY GEN. A. W. GREELY.

The importance of electrical communications in modern wafare emphasizes the necessity of perfecting methods therefor to the highest degree of efficiency. Special attention is given by the Signal Corps to the suitable equipment of its flying telegraph trains in all phases, from the connection of army headquarters with the permanent commercial lines to the provision for the temporary telegraphic or telephonic intercommunication between separate military commands, whether in camp or on the skirmish line.

Field or flying telegraphy, initiated by the United States during the war for the Union, keeps pace in its development with the astonishing advances of electrical science. Other nations nave gradually adopted American methods, which are now practiced by France, Germany, Great Britain, Italy, and even Japan, in maneuvers and in war.

Efforts have been continued with a view of obtaining in each flying train of the Signal Corps maxima of efficiency and of line length with minima of transportation and labor.

Continued experiments in field telephony and telegraphy have been carried on by Captain Allen and Lieutenants Maxfield, Green and Reber, of this corps, who have, in their respective military departments, remodeled the flying telegraph train, usually carrying 15 miles of poles and wire. After correction of defects which may develop in trial of these trains, they will be available as models for the future.

The most notable advance is in the development of the combined telegraph and telephone apparatus devised by Capt. James Allen, Signal Corps, which is distinctly superior to any previously constructed, and admirably answers all requirements. An operator can easily carry a combination telegraph and telephone office, and while one soldier telegraphs a message, another may, over the same wire, talk telephonically with another station, the distant receiving operators hearing only their own message. The outfit weighs but 16 pounds, including battery, and has been rigidly tested up to a distance of more than 600 miles, and is a pronounced success in its various capacities as a "buzz," Morse, telephonic and phonoplex instrument. The importance of this means of communication is not confined to the field work of the Signal Corps, but in its many applications may well become world-wide. Its practical value on cables entirely disabled has been demonstrated on the military cable between Angel Island and Tiburon, Cal. By attaching one of these instruments to either end of the cable, which was rendered entirely useless for the transmission of messages by ordinary methods nearly two years ago, it has been most successfully used for intercommunication between those places, without a single interruption, during the past year. This thorough test and practical use of the instrument sufficiently demonstrate its value. Improvements have been made by Captain Allen by providing an automatic cut-out for the battery when not actually in use in the transmission of a message, and further improvement in the apparatus is hardly expected.

Every post thus desiring has been supplied with telegraph instruments and materials for practice lines. Beyond the primary purpose of stimulating an active interest in military signaling, these lines have inured to the benefit of many men who have thus acquired telegraphic experience. Military posts have also been furnished with telephones and wire for establishing electrical intercommunication on target ranges, thus facilitating practice and insuring safety. The more important artillery ranges are equipped with the sling psychrometer, an automatic anemometric register, and either a compensated aneroid or a standard mercurial barometer.

At Fort Leavenworth, Kas., has been erected a telephonic exchange on conditions approximating those of actual field service. This materially facilitates administration and familiarizes student officers with modern methods of telephonic and electrical intercommunication.

* Abstract of "Report of the Chief Signal Officer to the Secretary of War for the Fiscal Year Ending June 30, 1897."

An English paper says that recently a young man from London arrived in a northern city, and wishing to let his friends in the south know of his safe arrival, he went into a post office (not the chief one) and inquired if he could send a telegram direct to London, and how long it would take. The young lady, who was inclined to be snubbish, cut short his inquiries with:

"I am not paid to answer silly questions."

Her face blanched wonderfully, however, when she found herself compelled to wire the following message: "Arrived safe. Girls here ugly and bad-tempered."

MUNICIPAL OWNERSHIP AND OPERATION OF STREET RAILWAYS.*

BY P. F. SULLIVAN.

The subject of this paper is one which can not be treated properly, or in other than a limited manner, within the time and space permitted. What I shall write, therefore, is intended more to suggest lines along which others may follow rather than to attempt to treat it exhaustively.

The subject will be considered under the two following heads:

Municipal administration in American cities is so extravagant and unbusiness like that in the interest of the public the powers and duties of municipalities should be reduced rather than be enlarged.

Municipal ownership and operation abroad are the exception rather than the rule, and were the reverse true, and such ownership and operation successful from a financial point of view, it does not follow that American cities could or should follow such examples, or that if they did so success would result.

As to whether we should experiment with socialism, particularly under our forms of municipal government, while still going through the experimental stage, and as to whether popular government should compete with private enterprises, I leave for other and separate discussion.

MUNICIPAL MALADMINISTRATION.

Thoughtful men view with alarm the growth of American cities, and the maladministration of their affairs; some go so far as to believe that both conditions seriously threaten the future of the republic. So alarming have these become that patriotic and thoughtful men, and women, too, have organized in nearly every city in the country with a view of arousing public opinion, of devising ways and means to purify local politics, and to obtain a fair return for money expended.

In nearly every large city in every state in the Union, from Maine to California, and from Oregon to Florida, such organizations exist under one name or another, and in some cities they go so far as to employ counsel and to instruct city governments in their duties. This is true of Boston, Providence, New York, Baltimore, New Orleans, Chicago, San Francisco and other cities. At the present time there are over fifty of such organizations in existence.

Not only are there local organizations, but such organizations also send delegates to national conferences to adopt methods of arousing public opinion and purifying local politics in every city in the Union. Conferences for good city government were held at Philadelphia in 1894, at Minneapolis and Cleveland in 1895, at Baltimore in 1896 and at Louisville in 1897. To show how general and widespread are municipal maladministration and corruption throughout the country, I quote below extracts from the remarks of a few of the delegates:

PHILADELPHIA CONFERENCE, 1894.

"On the other hand, a Chicagoan would have to be in full training and at his very best to attempt to do any boasting about his city politics. Indeed, he knows very well that, when compared with the government of any but American cities, the government of his city, like that of so many other cities of his country, is simply a deep disgrace to republican institutions and to the great democratic idea.

"FRANKLIN MACVEAGH,
"Chicago."

"It is no exaggeration of language to say that saloons and gambling houses and brothels are here nurseries for 'statesmen;' that the active hospitality of their keepers is, if not fatal, at least a grave impediment to success in public life, and that men and women who gain their living by habitually breaking the laws have a potent voice in selecting the public servants who make, interpret and execute those laws.

"CHARLES J. BONAPARTE,
"Baltimore."

"It must be admitted, however, that there are public servants who are not burning with desire to discharge their whole duty to their employers, and who have no wish to keep the channels of communication open between themselves and the respectable classes. Their tastes and ambitions will lead them in other directions. They have great faith in the power of the corrupt and disorderly elements of the population, and their closest alliances are with those who represent these elements. Under management of officials of this class conditions have been established in many of our municipal governments which are far from satisfactory. Unbusiness-like methods of administration have crept in; illicit relations with contractors and plunderers of all sorts have been formed; a thousand subterranean openings into the treasury have been discovered; the guardians of the peace are seen to be on the best terms with several classes of prosperous law-breakers; many officials are using the patronage of their offices with small regard for the interest of the city, but with a constant reference to their own political fortunes. There are honest men in the government, but they find it difficult to resist the rapacious and anarchical tendencies. When any such state of things exists, it is difficult for individuals to bring any effective saving influence to bear upon the city government. The task is one that requires the united and sustained efforts of many good men.

"REV. WASHINGTON GLADDEN, D. D.,
"Columbus, Ohio."

"There is no province where the American people need education more to-day than in the province of municipal government.

"But the governments of our great cities for the last 30 years have been our despair. Republican Philadelphia as bad as Democratic New York, Baltimore as bad as Chicago. The character of the men at the head of our city governments, our mayors and aldermen and common councils, has startlingly deteriorated. The proudest of American cities must blush when it thinks who the men are in its common council controlling its high interests, disbursing its millions of money, and representing its corporate life, when compared with the class of citizens who sit in the town councils of Birmingham and Glasgow, and the great cities of France and Germany. In almost everything that touches municipal administration we are to-day behind Europe. We have everything to learn and almost nothing to teach. It is, I say, disgraceful and humiliating.

"EATON D. MEAD, Boston."

"First. That we must keep more constantly before the people the perils to which we are exposed, and the menace to the safety of our free institutions, because of the corrupt governments of most of our large cities. In the light of the present day, was not Wendell Phillips right when he prophesied that the correct solution of the problem of our great cities would test our free institutions more severely than our struggle with human slavery. We all know that the cities are growing out of all proportion to the country districts. It is one of the phenomena of this century the world over. At the present rate of increase the cities will control this nation in 1920. Do we want these great cities as at present governed to hold this power?

"SAMUEL B. CAPEN, Boston."

"The officials of our great cities are not elected, nor their affairs managed for the benefit of the members of the corporation, to reward men for, and to encourage them in, holding or gaining the local votes to swell the majority of one or the other of the great national parties, which have no more interest in or concern with the good government of a city than a mob with the good management of a bank which it loots and plunders for the purposes of its own.

"JOHN A. BUTLER, Milwaukee."

CLEVELAND CONFERENCE, 1895.

"The city of Indianapolis has had its share in emphasizing the failure of American municipal government. What with boodle aldermen, boodle councilmen, and a loose financial system, with police and fire departments worth in votes to the party in control many times the number of employés, with a street department honeycombed with private and party snaps, boss ridden, party ridden and nearly wrecked by its servants, the city had all the decorations which entitled it to a place in the front rank of civic failures.

"LUCIUS B. SWIFT, Indianapolis."

"We have our machine, our political bosses, some unworthy men in office, the self-seeking contractor, the dishonest officer of election, the spoil seekers in legion. The spoil system is the one great octopus which is strangling virtue, truth and honesty in public life. The weapon of destruction that must be used is the searchlight of public opinion, blinding and destroying the evils which follow the creed that to the victor belong the spoils; that dishonesty is legitimate in politics; that the political party a man belongs to must be his infallible guide in municipal politics; that a public trust is no trust; that the political boss is *the* boss and that his mandate is the law, the right to the contrary notwithstanding.

"FRANK N. HARTWELL,
"Louisville, Ky."

"All municipal offices are held by ward bosses or their followers, and their success so intoxicated them that hardly were they well seated before they commenced their carnival of plunder and corruption. The men composing this administration were mainly of small means, and some of the councilmen were dependent upon their daily toil for their support, but, notwithstanding their salaries were meagre, or nothing at all, it was not long before they took on an air of general prosperity, ceased to labor at their usual vocations and waxed mightily in the goods of this world. In the Department of Public Works, for instance, at the present time, the inspectors and ward foremen almost equal in number the laborers they superintend. To recite the progress of the present administration is but to recount the sacrifice of the city's best interests and the complete prostitution for personal and political ends by its officers of their official powers. No private individual could obtain the most paltry privilege without being subjected to corrupt demands, and unless he complied, his request was promptly refused. The lesson taught the people by this administration has proved a most profitable one, and will, it is hoped, help to bring about the end of boss rule in this city.

"WALTER B. SPENCER,
"New Orleans."

"The investigations of the Committee of One Hundred have conclusively demonstrated that the first evil tendency of personal greed as opposed to the public welfare, instead of being sternly checked in this city of Portland, has been actually encouraged by its political managers. If a contractor voted his men aright, work was given him liberally, and the pay was prompt and excessive. Honest performance of the work itself was, however, a matter of little consequence. Miles upon miles of defective sewers and streets bear eloquent witness to the evil effect of political control in business matters. The contractor and the city officer felt their first duty was to each other's selfish interests, and contractors and officers can not well serve two masters. From the far West we send you greeting. Our city is no worse—is perhaps better—than some of yours, but our cause is a common one, and until our municipalities are honestly and economically managed upon business principles, the war both in the East and in the West should neither falter nor fail.

"THOMAS N. STRONG,
"Portland, Ore."

"The Board of Public Works consists of three members. Under the original charter this was simply a supervisory board, the various branches of the city work being under the charge of separate superintendents. As usual in large cities, this department was for a time the chief center of jobbery and intrigue in the city's affairs, appointments on the board were sought and used for political ends, and its patronage was used to promote the political fortunes of its own members or their political backers.

"EDWARD O. GRAVES, Seattle."

"It is, therefore, exceedingly unfortunate that a very large proportion of our office seekers are unfit or unworthy to fill the places they contend for. Men of character and ability are repelled by the conditions imposed or the services expected by those who control the nominations. Men who lead or belong to the vicious or predatory classes are eager and persistent in their efforts to secure the positions which enable them to increase their power or to defraud or oppress the people by such methods as those which have been so thoroughly exposed by the Lexow Committee in New York.

"CHARLES RICHARDSON,
"Philadelphia."

BALTIMORE CONFERENCE, 1896.

"In the first place we had everywhere enormous taxation, a taxation which produced a revenue sufficient, if it were honestly and wisely applied, to furnish every city in the land with every possible comfort and convenience, and even to adorn them with the triumphs of architecture and art. But all this was, in great part, misapplied, and the consequence was we had very little return for it. Our streets were miserably paved and everywhere in a filthy condition. The schools were poor; the police were corrupt from top to bottom and in collusion with evil doers. All departments of government were affected by the demoralization, and the official force, from the mayor down, in our principal cities, was of a character which we could not exhibit in the face of the world without a feeling of disgrace. These were the consequences which flowed from this demoralization. "JAMES C. CARTER,
"New York City."

(To be continued.)

* Read before the American Street Railway Association, Niagara Falls, N. Y., October 22, 1897.

LATE NEWS.

It is reported that the Akron, Ohio, Street Railway Company and the Akron & Cuyahoga Falls Rapid Transit Company may be united.

President Baldwin, of the Long Island Railroad, is considering the equipping of three of the lines of his road which converge at Jamaica—eight miles from Brooklyn—with electricity. He favors the third rail.

A trial trip of the new Heilmann electric locomotive was made on November 12 from Paris to Nantes over the Western Railway of France. The train hauled weighed about 200 tons. The locomotive weighs about 125 tons, and is said to be an improvement on Heilmann's first "central station on wheels."

The earnings for October of the Edison Electric Illuminating Company, of New York, including the high-tension systems, were as follows:

	1897.	1896.	Increase.
Gross.....	$314,590 60	$193,826 10	$20,764 50
Net.....	91,398 65	77,475 04	13,923 61
Gross, ten months....	1,958 335 12	1,775,632 65	182,702 47
Net, ten months....	857,253 88	737,208 21	120,045 67

Mr. Ernest Salzenberg, director of the gasworks of the city of Crefeld, Germany, has invented an improvement in incandescent gas burners, which relates to the production of incandescent gas light, based upon the discovery that, when the pressure of the gas is considerably increased upon the incandescence body, the said body emits a golden-yellow light, very agreeable to the eye, displaying objects in their natural colors.

A charter has been granted in Pennsylvania to the Washington, Westminster & Gettysburg Electric Railway Company, which will build a line 14 miles long from Gettysburg to the state line. This is the company which intends to build a line to Washington, D. C. The capital stock is $400,000, and the officers are: President, James B. Colgrove, Washington; directors, Samuel S. Bushman, Charles A. Trastel and Henry C. Little, Gettysburg; Henry A. Cady, Washington; Charles A. Duttera and John A. Shore, Littlestown.

Under foreclosure proceedings instituted by the State Trust Company, of New York city, all the real estate, chattels, franchises and plants of the State Electric Light and Power Company, the Amsterdam Electric Light, Heat and Power Company, the Louis Esposito and John Simmons Company, have been sold to P. Chauncey Anderson for $35,000. Mr. Anderson represented the Amsterdam company that has a lien on the property for about $1,000,000. The trust company held a mortgage on the various companies for $214,000. All are located in Brooklyn, N. Y.

A lease for 999 years of the Coney Island & Gravesend Railway Company to the Nassau Electric Railroad Company, of Brooklyn, N. Y., has been filed with the Secretary of State. Part of the Gravesend company's lines are yet to be constructed, but the lease covers all. The consideration named is that the Nassau company shall pay the costs of construction and all taxes and assessments on the Gravesend lines, and also the sum of $150,000 in cash, with five per cent interest, within the next five years or at the expiration of that period. The lease is signed by P. H. Flynn, president, and Fred C. Cochen, secretary, of the Coney Island & Gravesend Railroad Company, and by A. L. Johnson, president, and W. F. Ham, secretary, of the Nassau Electric Railroad Company.

The Underwriters' Fire Equipment Company, of Brooklyn, N. Y., has been incorporated to manufacture and sell a dry gas extinguisher for extinguishing fires, so constructed that, when turned bottom up, it throws dry carbonic acid gas, and when turned back it throws liquid. The capital stock is $150,000, consisting of shares of $50 each, and the directors for the first year are A. C. Rowe, of New York; Robert Brown and Frank C. Mason, of Brooklyn, and Frederick Pearce, Frank McGurk, Charles McGuire and Denis J. McCarthy, of New York. The necessity of a means of extinguishing fires caused by electric current on switchboards and cables without the use of water has long been recognized. The Underwriters Fire Equipment Company seems to have solved the problem, and are about to place in the market the dry gas fire extinguisher mentioned above, which, after a year's severe test, has been found to fully fill the requirements of such apparatus.

A Good Thing for Open Cars in Rainy Weather.

Mr. Charles A. Mann, of Bangor, Me., has invented a scheme which will, if it comes up to expectations, relieve travelers on open street cars in rainy weather of much inconvenience and annoyance. Every one knows that riding on the weather side of an open car during a shower is not all that it is cracked up to be. The water collects along the edge of the roof and drops upon the passenger in spite of curtains or awnings. Mr. Mann proposes to equip each car with a gutter, running around the edge of the roof. The gutter, of course, would be of no use without downspouts, and the inventor has hit upon the clever idea of using the brass tubes now used as hand-rails for carrying off the water from the roof and discharging it upon the ground. It is understood that several large car manufacturers have applied to Mr. Mann for permission to use his device. It is certainly a unique idea and just what would be expected of a Yankee inventor.

New York Electrical Society.

The 183d meeting of the New York Electrical Society, postponed from the eighth instant, will be held at Columbia University, on Monday, November 22, at 8 P. M. Dr. M. I. Pupin will give an address on "The Physics of the Ether."

American Society of Mechanical Engineers.

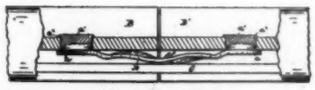
The eighteenth annual or thirty-sixth meeting of the American Society of Mechanical Engineers will be held in the society's building, 12 West Thirty-first street, New York city, from November 30 to December 3 inclusive. The convention will be opened at 9 P. M., on Tuesday, November 30, at the society's parlors, at which time President Worcester R. Warner will deliver the annual address, entitled, "The Evolution of the Telescope."

During the meeting the afternoons of each day have been left open so that the members of the society may visit points of interest in and around New York. Included in the programme on Wednesday evening is a report from Mr. C. J. H. Woodbury, who was a delegate from the society to the conference on Standard Electrical Rules. On Wednesday evening at 9 o'clock a reception and *conversazione* will be held at Sherry's, Thirty-seventh street and Fifth avenue. On Thursday evening Mr. W. B. Smith-Whaley will read a paper, entitled, "Electricity in Cotton Mills." On Friday morning Mr. A. L. Rice will read a paper, entitled, "A Convenient Form of Wire-Testing Machine."

Among the places of interest to be visited by the delegates are the power-houses of the United Electric Light and Power Company. Niagara Falls, N. Y., is being considered as the probable place for the Spring meeting of 1898.

A New Rail-Bond.

Mr. William H. Wiggin, of Worcester, Mass., has been granted a patent on a rail-bond, which is shown in the accompanying diagram. The patent, which has been assigned to



A NEW RAIL-BOND.

the American Electrical Works, of Providence, R. I., contains these claims:

Claim—1. An electrical rail-bond, composed of a flat-sided plate, provided on one of its side faces at its respective ends with terminal studs, adapted to set in apertures in the web of the meeting ends of rails, and having a partial, flatwise twist in its central portion or body, between said terminals, substantially as and for the purpose specified.

2. An electrical rail-bond, composed of an edgewise-curved, flat-sided plate, provided on one of its side faces at its respective ends with terminal studs, adapted to set in apertures in the web of the meeting ends of rails, and having a partial, flatwise twist in its central portion or body, between said terminals, substantially as and for the purpose specified.

The New York State Railroad Commission has approved the application of the Dry Dock, East Broadway & Battery Railroad Company, of New York city, for permission to change its motive power from horses to an underground trolley system.

The Age of Water-Power.

Time was when water was the leading source of energy for the power necessary to drive the machinery of mills and factories, says the *Scientific American;* but the cumbersome and otherwise unsatisfactory nature of the old under or overshot wheel, and the necessity for locating the factories where the power was generated, was a severe drawback to its usefulness. The introduction of steam, with its advantage of being generated wherever the factory might be situated, led to the disuse of water-power in almost all cases where coal was available.

The advent of the dynamo and the motor opened a new and wider sphere of usefulness for water-power. It gave to it something of the mobility of steam-power, and unwound the chains which had tied it down to the banks of the rivers and streams. The water-wheel gave place to the turbine, and electrical transmission has carried the silent energy to distant cities and the scattered centers of industry. And who shall place a limit to the distance that may be covered? The recent developments of electrical science point to the possibility of transmitting the stored energy of our rivers and waterfalls to vast distances with but a trifling loss; and with the improvements which analogy teaches us to expect in this comparatively new branch of engineering, we may look for its successful competition with steam in districts far removed from the source at which the power is generated. When this time shall come, it is quite conceivable that Niagara will be depleted of its waters, if the authorities are so utilitarian as to allow it.

The statistics of the present state of the art show that it is advancing with rapid strides. America leads the world with a total installation of over 70,000 horse-power. Switzerland comes next with 32,000 horse-power. France has 18,000 horse-power, and the great power plant at Rheinfelden, Germany, will give Germany the fourth place with about 17,000 horse-power. Italy has nearly as much, and Norway and Sweden are each credited with 15,000 horse-power. In Great Britain there is a total installation of about 4,000 horse-power. These figures suggest that the development of its water-power may have a powerful influence in rearranging the centers of industry throughout the world. With the exception of the United States, the best natural water-power is located in countries that are deficient in coal-beds, and, on the other hand, the leading manufacturing countries, as a rule, are deficient in water-power. Switzerland, Italy, Norway and Sweden have in the new system a powerful ally that will assist to bring them well to the front as industrial nations. To the United States, which already possesses enormous deposits of coal, the full development of her natural water-power will mean the more speedy coming of that commercial supremacy which is already well within its grasp.

ADVANCE INFORMATION

New Electric Railways.

SAN DIEGO, CAL — An electric road connecting this place and La Mesa is talked of.

MILFORD, MASS.—A company has been formed here under the general railroad laws for the construction of the Milford & Woonsocket Street Railway early next year. The stockholders are W. S. Reed and J. S. Reed, of Leominster; George E. Tylee, G. M. Hyde, C. L. B. Tylee, of Corning, N. Y.; W. H. Tylee and O. W. Rugg, of Worcester; N. S. Myrick, of Boston; G. W. Goddard, of Cambridge; C. W. Shippee, C. E. Guild, M. J. Buckley, G. M. Billings, W. H. Buker, of Milford; C. M. Thayer, of Hopedale; C. E. Bates, of Mendon. The route is to be from the Mansion House, Milford, through South Main street to South Milford, thence through East Mendon, Mendon Center and Blackstone to the state line near Harris pond, a distance of 11 miles.

GLOUCESTER, MASS. — The Rocky Neck Marine Railway Company has been incorporated, with James H. Tarr, president; James G. Tarr, treasurer; these, with Daniel S. Tarr, Thomas L. Tarr and Gardner W. Tarr, directors; capital, $26,000.

PITTSFIELD, MASS.—A plan is on foot to build a trolley line from this city to Northampton, and work will begin as soon as the company is formed and the money raised. The project is claimed to have Chicago capital back of it.

ALBANY, N. Y. — The railroad commissioners have granted the application of the Dry Dock, East Broadway & Battery Railroad Company, of New York city, for permission to change its motive power to the underground system of electricity.

WHITINSVILLE, MASS.—The Selectmen have granted a franchise to the Blackstone Valley Railway Company to extend its tracks to the village of Rockdale. The extension will give good railway accommodations to Worcester.

LIMA, OHIO—The Lima & Columbus Electric Railway Company has been incorporated; capital stock, $50,000

DETROIT, MICH. — The Detroit, Ann Arbor & Ypsilanti Electric Railway has been incorporated. The capital stock of the company is $400,000. Incorporators are James D. Hawks, president of the Detroit & Mackinac Railway; S. F. Angus, John C. Liggett, and others.

YOUNGSTOWN, OHIO—The Mahoning Valley & Southeastern Electric Railway Company has been granted a franchise to build an electric line from this place to Struthers, a distance of six miles. The company will have a capital of $100,000. It is said the company expects to run the line to Lowellville.

TUCSON, ARIZ. — Within a week ground will be broken for a street railway (the first in Tucson) that will connect the business center of the city with the Territorial University, several miles distant. The road will be in operation for its entire length by January 1.

HART, MICH.—The proposed electric railway from Ludington to Hesperia, with power plant in this place, is now an assured fact. The company has let the contract for furnishing the ties to J. K. Flood, of this place.

FORD CITY, PA.—A company is being formed for the purpose of building an electric railway from Kittanning to this place.

MCKEESPORT, PA.—The East McKeesport Railroad Company has been incorporated, with a capital stock of $35,000. The company will build an electric line from McKeesport through Versailles, North Versailles and McKeesport to Wilmerding.

OCEAN VIEW, VA.—The Ocean View Electric Railway Company has been granted permission to extend its line in Brambleton, Va.

PARKERSBURG, W. VA.—The Parkersburg & Marietta Traction Company has been formed to construct an electric railway from this city to Marietta, Ohio.

DE LASSUS, MICH.—The De Lassus & Farmington Railway Company has been formed for the purpose of constructing an electric railway from this place to Farmingham, a distance of three miles.

Electric Light and Power.

DENVER, COLO.—The Blue River Electric Power Company has been incorporated. The capital stock is to be $50,000. Mason H. Kern, Newark L. Burton and William H. Kern are named as directors for the first year. Operations will be carried on in Summit, Lake, Eagle and Clear Creek counties.

CINCINNATI, OHIO — The Post Clover Electric Light Company has made application for a receiver for the city of Hamilton.

MIDDLETOWN, N. Y.—The controlling interest in the Middletown Gas and Electric Light Company has been sold to George R. Jackson and associates, of Newark, N. J.

ALBANY, N. Y.—The Montour Falls Electric Light Company has been incorporated. Capital, $10,000. Directors, Eli A. Dunham, Fred J. Dunham, of Montour Falls, and Wm. H. Hawker, of Addison.

SLOAN, IOWA—The business men of this place are agitating the subject of electric lights.

WASHINGTON, D. C.—The H. P. Hill Lighting Company has been incorporated by Messrs. H. P. Hill, F. J. Whitehead and A. L. Bogan. The object of the concern is to furnish electric lights in the District. The capital stock is fixed at $10,000.

LONG BEACH, CAL.—An electric light plant is being put in at this place.

GAS CITY, IND.—Plans are being prepared for an electric light plant to be constructed here.

LAKE GENEVA, WIS.—The Equitable Electric Light Company has been incorporated. Capital, $9,000. Incorporators, H. B. Tyrrell, Frank Rogers and W. J. Cutteridge.

SHERIDAN, IND.—Electric lights are to be established here.

CLINTON, KY.—The Clinton Water and Light Company has been incorporated, with a capital stock of $15,000.

CORBIN, KY.—The Mayor may be addressed for information concerning erection of electric light plant, for which franchise has been granted.

LA GRANGE, MO.—S. G. Lewis, Mayor, may be addressed concerning erection of new electric light plant, for which $6,000 was voted recently.

LOUISVILLE, KY.—R. K. McClure may be addressed concerning electric light plant.

DAYTONA, FLA.—An electric light plant will be established in the Spring.

NEW AUGUSTINE, FLA.—Steps are being taken to establish an electric light plant.

SAVANNAH, GA.—Mayor Meldrim can give information concerning establishment of electric light plant.

SCOTTVILLE, N. Y.—A company is being organized to construct an electric light plant.

VERNON, B. C.—An appropriation of $12,000 has been given for the construction of an electric light plant.

APPLETON, WIS.—M. K. Gochnauer, City Clerk, may be addressed concerning electric light service.

SOMERSET, KY.—F. R. Griffin, Mayor, may be addressed concerning sale of franchise for a term of 20 years, to light the streets by electricity.

ELKIN, N. C.—Private parties will put in an electric plant to light the town. The contract for same has been given to the Electrical Engineering and Supply Company, Charlotte, N. C., and Crocker-Wheeler apparatus will be used.

New Telephone and Telegraph Companies.

SIOUX CITY, IOWA—The Iowa Telephone Company is building a line from Blencoe to Missouri Valley.

WELLSBURG, W. VA.—The Wellsburg Telephone Company has let construction of its telephone system.

COLUMBUS, OHIO—A new telephone company, organized to connect Columbus, Delaware, Marion, Newark, Mt. Vernon and other places on a telephone circuit, has been incorporated, with a capital stock of $30,000. The headquarters of the company is to be in Delaware, and the incorporators are Lyman P. Lewis, Ed L. Barbee, James S. Brailey, Jr., Charles D. Juvenall and J. C. Wood. The termini of the company are to be in Marion and Columbus, passing through the counties of Marion, Delaware and Franklin, with branch lines extending to Newark, Mt. Vernon, Marysville and Mt. Gilead, passing in and through the counties of Licking, Knox, Marion and Morrow.

STANBERRY, MO.—The Stanberry Telephone Company has been incorporated. Capital stock, $10,000. Incorporators, L. M. Hall, A. C. Frisbia, Ed E. Alshire and others.

NELSON, COLO.—The Vernon & Nelson Telephone Company will have its long-distance telephone line from this place to Rossland completed in a few days.

SPRINGDALE, ARK.—A telephone exchange has been put in at this place.

ROUND MOUNTAIN, TEX. — Mr. David Martin, manager of the Round Mountain & Blanco Telephone Company, has just completed the extension of their line to Sandy, Tex.

CALDWELL, TEX.—A stock company is being organized to put in a system of telephones in this county.

OAKLAND, ILL.—A telephone exchange has been established at this place.

LEXINGTON, VA.—The telephone line between this place and Clifton Forge is nearly completed and will be in operation in a few days.

PIEDMONT, W. VA.—The Gordon Telephone Company has completed a telephone system at Piedmont, and is about to make long-distance connections with other points. Company's capital stock is $100,000, and $50,000 of this is fully subscribed.

LEIGHTON, TENN.—A telephone line is being built from this place to Sheffield, a distance of 12 miles.

New Incorporations.

SAN FRANCISCO, CAL.—R. B. Elder, Scott Elder, W. H. Metson, F. C. Drew and Ida G. Chagnette have incorporated the Pacific Arc Lamp Company, with a capital of $30,000.

CHICAGO, ILL.—The Kindl Car Truck Company has been incorporated. Capital stock, $150,000. Incorporators, Fred P. Vose, J. E. Coursen and R. Berman.

WARREN, OHIO—The American Incandescent Lamp Company has been incorporated. The capital stock is $50,000, and the incorporators are I. E. Ackerley, Albert H. Krietler, C. C. McNutt, Jr., Z. F. Crover and John J. Sullivan.

Increase of Capital.

ST. LOUIS, MO.—The Phœnix Carbon Manufacturing Company has increased its capital stock from $100,000 to $160,000.

HARTFORD, CT. — The Hartford Electric Light Company has increased its capital stock from $150,000 to $500,000.

SAN ANTONIO, TEX.—The Postal Telegraph-Cable Company has filed an amendment with the Secretary of State increasing its capital stock from $600,000 to $1,200,000.

Kindred.... ...Interests

M. R. Rodrigues, of Brooklyn, N. Y., has perfected a novel form of rheostat adapted for battery current regulation, having two to four ohms of resistance.

A new catalogue of the General Incandescent Arc Light Company, 572–78 First avenue, New York, has recently been prepared illustrating the "Unique" long life arc lamp.

The Faultless Dixon Lead-pencils are brought to public attention by a unique monthly blotter calendar for November, issued by the Joseph Dixon Crucible Company, Jersey City, N. J.

Baker & Company, platinum refiners, of Newark, have recently published a little brochure entitled "Platinum," showing the source of supply, method of identification and separation of the platinum ore.

An order was recently placed with the Scott & Janney Electric and Manufacturing Company, of Philadelphia, for the United States battleship "Alabama," now being built at Cramp's shipyard, for 10 motors to operate the ammunition winches.

The boiler plant in the new Astoria Hotel, constructed by the Babcock & Wilcox Company, as mentioned in the ELECTRICAL REVIEW, aggregates about 3,000 horse-power, and is worthy of study by engineers who are interested in steam equipments.

The B. F. Chase Company, the well known sign makers, were the fortunate contractors who secured all the illuminated sign work for the recent Horse Show held in Chicago. They used exclusively the Sunbeam incandescent lamp, a number of them being the special four candle-power lamp designed especially for sign work. The Western Electric Company is agent for this lamp.

The Ford-Bailey Advertising Company have established offices in the Bowling Green Building, New York, for the conduct of the general advertising business, devoting much attention to the industrial and mechanical lines of publishing. The gentlemen interested are both men of experience in matters pertaining to advertising, as the field is one in which talent and energy are at a premium.

The Western Electric Company has furnished a room 18 by 18 feet in the rear of its Chicago store as a show room for fixtures. Numerous chandeliers and brackets have been placed in this room and these have been wired up with two-point, three-point, four-point and combination switches in order to show the methods by which lights in private houses may be controlled. A large variety of beautiful shades is shown on the fixtures. Five of the Western Electric inclosed arc lamps are also exhibited.

The American Electric Meter Company announce that they are now ready to take orders for early delivery of all sizes of three-wire constant potential registering meters. When described and illustrated in the ELECTRICAL REVIEW this meter was said to be an innovation. It is calibrated ready for instant use, also measures correctly with uneven loads, and is so delicate in adjustment that $\frac{1}{1000}$ of a horse-power is recorded. In construction it is hermetically sealed, and is mechanically shielded with a direct reading method eliminating the multiplier. No springs, jewels, nor frictional sources of errors are used.

The Telephone Manufacturing Company, of Sumter, S. C., has just issued a very handsome catalogue describing the "Imperial" telephone switchboards and telephone appliances. The catalogue is unusually well prepared and handsomely illustrated. The "Imperial" apparatus presents a workmanlike appearance, and judging from the testimonials contained in the catalogue is a perfectly satisfactory talking machine. The company has made a number of large installations in the South, and seems to have a high grade interior telephone system. Among other places equipped with the "Imperial" telephones is Mr. George W. Vanderbilt's estate at Biltmore, N. C.

Contracts have been made with Messrs. Sanderson & Porter, electrical engineers and contractors, of New York, with the Bethel, Va., Electric Light and Power Company, for the installation of an electric plant to use water power. The generator will be 150 kilowatts, three-phase, of the 6,000-volt induction type. Also these engineers are constructing for the White River Electric Company a line from Bethel to Randolph to have a carrying capacity of 6,000 volts, the White River Electric Company buying power from the company at Bethel and owning their own line, which begins at the switchboard at Bethel. Step-down transformers will be used, and local distribution of current in Randolph will include 2,500 lights, both arc and incandescent. The "Burnham" type of water wheel will be used.

The J. & E. Stevens Company, of Cromwell, Ct., manufacturers of toys of all descriptions, have decided to rebuild their foundry building, recently burned. The new buildings will be constructed as near fireproof as possible. The framework of the buildings will be steel and the covering will be corrugated iron. The Berlin Iron Bridge Company, of East Berlin, Ct., have the contract for furnishing and erecting these buildings in accordance with their designs. The main foundry portion is 40 feet wide and about 200 feet long. The trusses have a clear span. The sides of this building have been designed so that it is well lighted by large mullion windows. On the roof are placed, at suitable intervals, ventilators arranged with shutters so that they can be readily opened and closed for the purpose of ventilation. The cupola platform and floor is built of steel framework and covered with steel plates. Besides the foundry building proper, there are two small brick buildings having a steel roof, one a boiler shop and the other a plating room. All the buildings are lined with Berlin patent lining.

Ostrander's New Catalogue.

W. R. Ostrander & Company, 22 Dey street, New York city, manufacturers of electrical house goods and supplies, have just issued the eleventh edition of their revised catalogue. It is a pamphlet of 247 pages, thoroughly illustrated, and covering full information on speaking-tube hardware, electric bell goods, electric light material, telegraph and telephone goods, and general electrical supplies. The company also manufactures bell-hangers hardware and pneumatic call bells. The descriptive matter in the catalogue is very conveniently arranged and altogether the catalogue is a credit to this old established house.

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Good Telephone Books.

"PRACTICAL INFORMATION FOR TELEPHONISTS,"
BY THOMAS D. LOCKWOOD.
The Telephone Man's Text Book.
192 Pages. Price, $1.00.

"TELEPHONES, THEIR CONSTRUCTION AND FITTING,"
BY F. C. ALLSOP.
Description of Receivers, Transmitters, Switch Boards, Complete Instrument Switches and Switch Boards, Erecting Telephone Lines, Overhead Wires, Instruments, Connecting, Testing for and removing faults.
256 Pages. Illustrated. Price, $2.00.

"TELEPHONE LINES AND THEIR PROPERTIES,"
BY W. J. HOPKINS.
Contents: Design and Construction of City Lines.
Underground Work.
Long Distance Lines.
Wire, Insulators, Exchanges, Switch Boards.
The Propagation of Energy.
The Telephone Current.
Measurement.
Properties of City Lines, Cables, Etc.
Price, $1.50.

"MANUAL OF TELEPHONY,"
BY W. H. PREECE AND ARTHUR T. STUBBS.
Price, $5.50.

"ELECTRIC TELEPHONY,"
BY E. J. HOUSTON AND A. E. KENNELLY.
New. Price, $1.00.

"HOW TO MAKE AND USE THE TELEPHONE,"
BY GEO. H. CARY.
The purpose for which this book is written is to furnish information to those who may desire to construct or use telephones, telephonic apparatus or lines on a small scale.
Price, $1.00.

"TELEPHONE TROUBLES AND HOW TO FIND THEM."
BY C. H. HASKINS.
A practical little treatise for telephone inspectors, exchange managers, and employés who are not electrical experts, as well as the general public who use telephones or private lines.
Price, 25c.

"THE TELEPHONING OF GREAT CITIES,"
BY A. R. BENNETT.
Price, 50 Cts.

"THE PRACTICAL TELEPHONE HAND BOOK,"
BY J. POOLE.
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Electrical.... Patents.

[Specially reported for this journal by E. S. Duvall, solicitor of patents, Loan and Trust Building, Washington, D. C. Copies of any patent may be secured for 10 cents each.]

ISSUED NOVEMBER 9, 1897.

591,187 Electrical instrument; W. C. Banks, New York, N. Y.—The combination of a circuit, including a resistance, a generator, an electro-magnet circuit-breaker, the latter two of which are always in circuit, a second resistance and a short circuit about it, all arranged substantially as set forth, whereby the removal of the first resistance will operate the circuit-breaker to open the short circuit about the second resistance, and constitute its circuit a part of the only complete circuit through the generator.

593,193 Battery cup; J. A. Britton, Phillipsburg, N. J.—In a gravity battery the combination with a jar, copper and zinc, of a cup provided with an open bottom, covered by a textile material and having a supporting flange about its upper edge and adapted to rest upon the upper edge of the jar.

593,230 Magnetic circuit-breaker; D. N. Moore, Newark, N. J.—A circuit-breaker having a tongue or vibrating part in magnetic equipoise, and means for intermittently moving it from equipoise.

593,237 Electric switch for chandeliers or brackets; J. W. Parkin, Philadelphia, Pa.

593,244 System of electrical distribution; C. F. Scott, Pittsburgh, Pa.—A system of electrical distribution, comprising an alternating current generator, its circuit and translating device fed thereby, and a step-up transformer interp sed in the circuit, approximately midway between the generator and translating devices, for raising the electromotive force to substantially the maximum limit allowable at the generator.

593,245 Apparatus for party telephone lines; C. E Scribner, Chicago, Ill.

593,265 Cloth-cutting machine; Jno. Wolf, Jr., Cincinnati, Ohio—In a machine of the character described, a foot-plate having a roller-equipped shaft and a gravitating cloth-lifter pivotally engaged with and supported by said shaft.

593,282 Apparatus for assembling commutator bars; S. H. Short, Cleveland, Ohio.

593,286 Electric switch; H. E. Waite, New York, N. Y. A switch-arm provided with a contact-piece having a narrow and a broad contact, a handle for moving the same, and a spring for holding the contact-piece in normal position.

593,301 Trolley; E. Lane, Johnstown, Pa.

593,314 Signaling system, C. E. Sterling, New York, N. Y.

593,332 Battery zinc; Dora Ogden, Columbus, Ind.—The combination of an electrode, means carried thereby for interlocking with a similar electrode, and means by which two such electrodes may be independently held in a cell, the arrangement being such that one electrode will lie immediately below the other.

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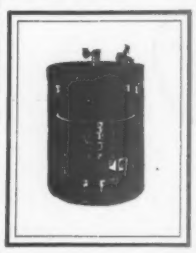
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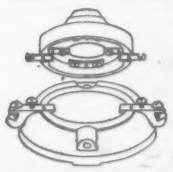
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